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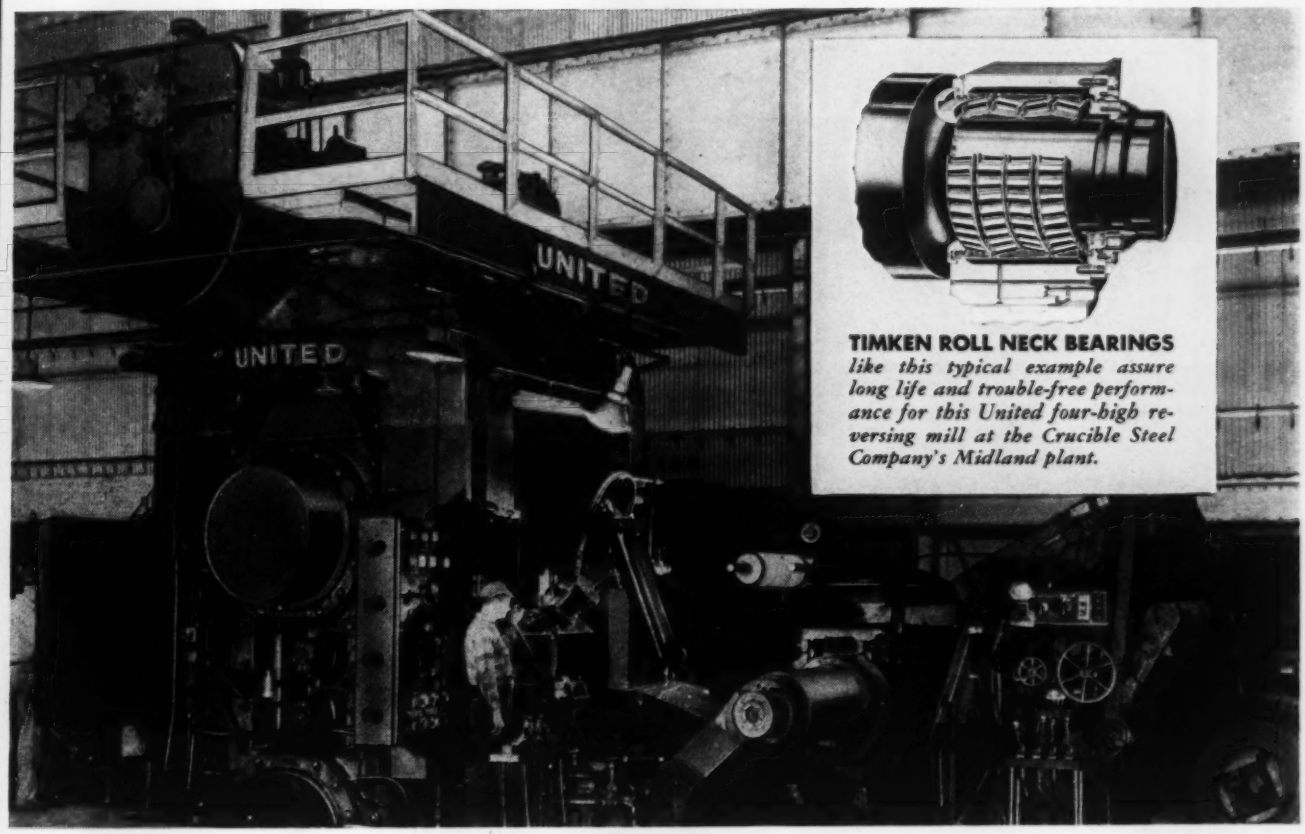
STEEL

The Magazine of Metalworking and Metalproducing

CONTENTS — PAGE 45



TIMKEN ROLL NECK BEARINGS
like this typical example assure long life and trouble-free performance for this United four-high reversing mill at the Crucible Steel Company's Midland plant.

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TO assure long life and trouble-free performance, Crucible Steel Co. chose this Timken®-equipped United 54" four-high reversing mill for their Midland, Pa. plant. Work rolls, back-up rolls and screwdowns all turn on Timken tapered roller bearings. Timken roll neck bearings reduce friction, permit higher rolling speeds and eliminate roll neck wear.

Thanks to balanced proportion design, Timken bearings provide greater mill rigidity, permit larger roll necks than ever before possible with tapered roller bearings. Roll neck strength is increased 50 to 60%, load ratings up to 40%. Tonnage records in typical mills indicate that Timken bearings keep bearing cost-per-ton-of-steel-rolled to a minimum.

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THAT SOLID CAST IRON FRAME protects *Safety-Circle* working parts against physical damage from every angle. The completely enclosed bottom provides extra protection and extra strength. End brackets are drip-proof at no premium.

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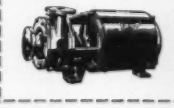

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

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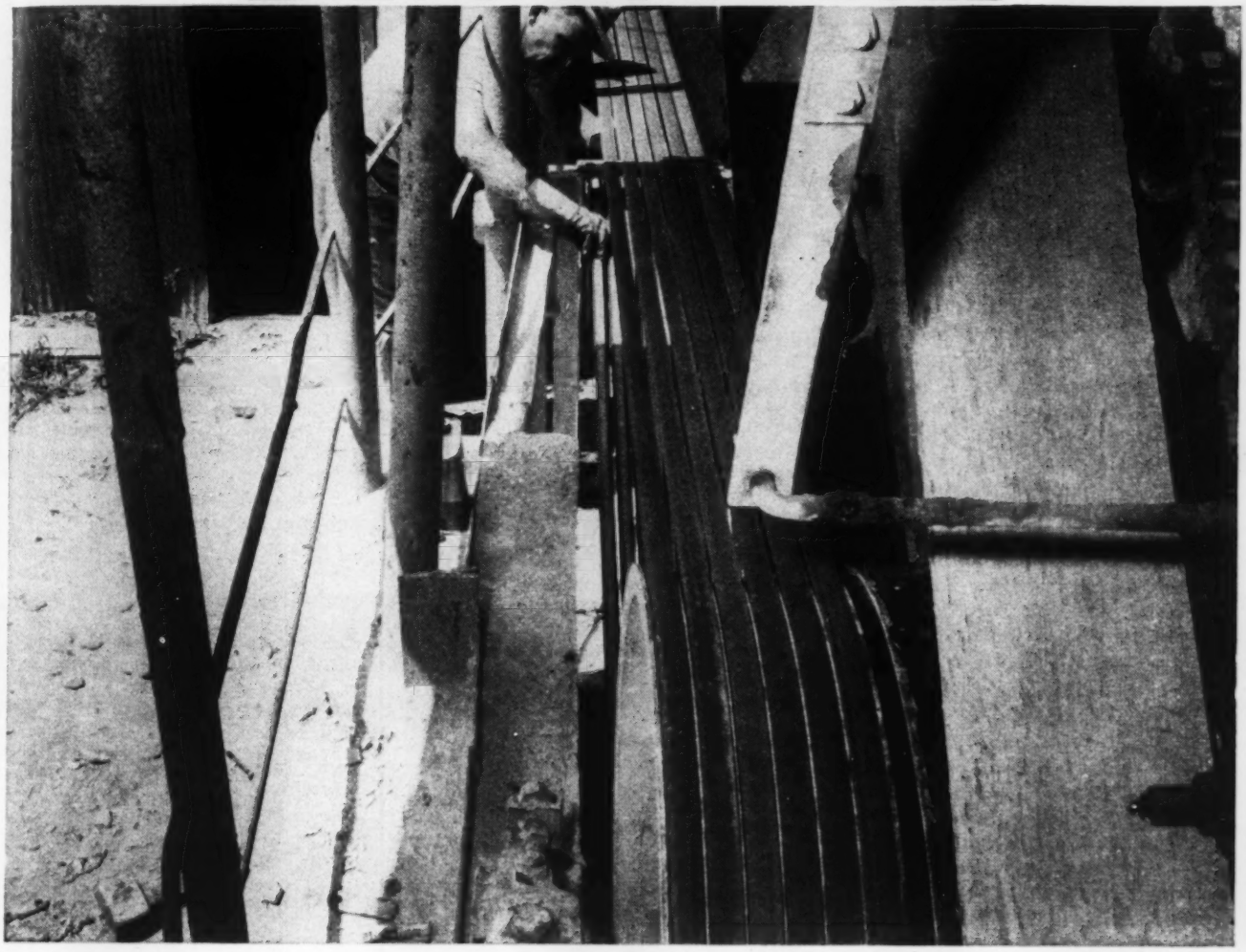


Where failures meant shutdowns they changed to grommet V belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

POWER transmitted here drives a rock crusher 8 hours a day, 5 days a week. When the drive stops, rock crushing stops and the plant shuts down. Previous V belts suffered from shock loads, wore out fast. A BFG man recommended the grommet V belt to stand the jerks and hard pulls. The grommet V belts shown here have been in service 2 years, with no shut-offs or shut-downs for maintenance. Here's why the grommet V belt lasts 20 to 50% longer:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). At present made in D and E sections only. See your local B. F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

STAINLESS STEEL SURFACE FINISHING

Attractiveness and usefulness of stainless steel depends a great deal upon the surface finish. The user of stainless should first select the strip steel with a finish that comes closest to what he wants on his finished product. Then by grinding, polishing, buffing and/or electropolishing he can bring the brightness of his product to the exact degree he desires.

Because of the nature of stainless steel, some precaution is necessary. For example, the thermal conductivity of all stainless steel is low and the frictional qualities, high. Overheating and scorching is likely to occur, impairing the corrosion resistance, if some care is not exercised. Because of the high coefficient of expansion some buckling and distortion will occur if the work is allowed to become overheated. However, these things are easily corrected if the fabricator properly processes the work.

When employing mechanical methods (grinding, polishing and buffing) to acquire a finish it is essential to avoid the presence of iron in abrasives and lubricating compositions such as stick grease, tallow and rouge. Many manufacturers produce abrasives and lubricants of the desired purity. Frequent dressing of wheels will keep them from "loading up" and producing objectionable scratches. It is important to apply successive abrasives in the proper sequence to avoid undue scratching. Lubricated abrasives are usually preferred over dry abrasives of the same grit number because they produce a softer, finer finish.

Finishing Welds: work with weld, not across it . . . do not allow work to become overheated . . . rubber wheels are preferred because they have less tendency to "load-up" . . . speeds of about 5000-6000 linear feet per minute is good for rough grinding . . . when matching mill finish cut with fine grit in the direction of the original polishing lines.

(This is the seventh of a series of reports on stainless steels that appear monthly in this column through the courtesy of the **Sharon Steel Corporation.**)

Advertisement

Behind the Scenes . . .

Summary

All Gaul is divided into three parts and so is STEEL—into the news, production-engineering and market sections. Leading off the third part each week is the Market Summary that in this issue is on page 119.

Market Editor Bill Rooney is the Summary's author, or "compiler" as he prefers to put it. Each week he pores over the market reports submitted by regional editors and correspondents, studies price trends and correlates the mass of material into capsule form for you busy readers. If you want to get the supply, demand, production and price happenings in the steel industry for the preceding seven days, the Market Summary is the place to find it.

The Summary has been one of the major features of STEEL since the magazine began in 1882. Editor-in-Chief Earl Shaner once authored it, as did Ed Kreutzberg, who is now Washington Editor. Bill has been writing it since 1947.

The Summary consists of about 500 words a week, boiled down from reports that add up to many times that many words on happenings in every important metalworking center of the United States.

Joy Ride

We've just returned from a vacation in Michigan that involved a 1000-mile trip in our three-year old car.

During the course of that trip, our vehicle (we hesitate to call it an automobile) developed a leaky fuel pump, a faulty voltage regulator, a blown out muffler, bad brakes and defective windshield wipers.

We spent part of our time at a vacation resort on Lake Michigan where it rained for four and a half days without letup. On the one nice day at the resort we went out in a sailboat and were becalmed for four hours on the lake.

We're glad to be back in our little office under the steampipes. We're delighted to be talking to you again.

Rural Note

If you're looking for a little scenic beauty, you don't need to drive miles to see it. Just turn to page 32 of this issue and let your eyes feast on the beautiful photograph that National Forge & Ordnance Co. is using to tell you about its steel forgings.

Another rural note is sounded this week on page 13 by Associated Spring Corp. It has devised a "spring plant" that would defy classification by the most learned botanist.

No Dog Lover

A World War II veteran of the K-9 Corps has just written in for us to hold up on his STEEL subscription until he finds out his new address. He's been recalled to service. The poor fellow says he doesn't much care for dogs.

Puzzle Corner

Charley, in the problem of Sept. 25, walked 50 minutes before his wife met him. First in with correct answers to that puzzle were C. B. Huizenga of Kawneer Co., William J. Kerr of National Tube Co., M. S. Bailey of Machine Products Corp., C. I. Gardner of Orinoco Mining Co. and C. E. Norton of Highland Park, Ill.

F. Steele Blackall III of Taft-Peirce Mfg. Co., Woonsocket, R. I., submits this one:

A financial promoter needed money desperately to keep afloat a scheme he was working on. He sent a telegram to a friend he had helped in the past that read:

```
  SEND
  MORE
 -----
 MONEY
```

The telegram was in a code with which the friend was familiar. It is a simple addition of two four-digit numbers to make a five-digit number. Each letter stands for a digit, 0 through 9. Each letter represents the same digit every time it appears. How much money did the promoter want?

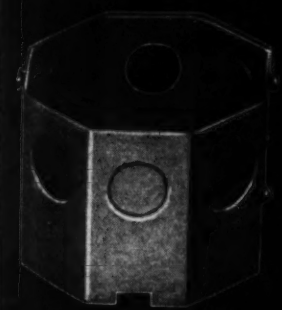
Shrdlu

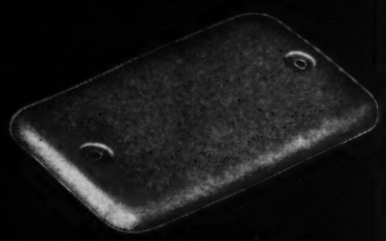
(Editorial Index—page 45)

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

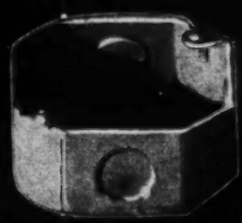
GALVANITE*

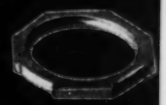
MAKES BETTER PRODUCTS FOR ELECTRICAL MANUFACTURERS





The special tight bond of zinc to steel makes Galvanite* the most desirable material where severe fabrication of rust-repelling steel is necessary. The finish stays put—cutting reject losses and adding to sales appeal. It doesn't flake or peel or coat dies—saving production time and costs. For the same reasons it won't fail—bringing everlasting customer satisfaction. For electrical hardware—or anything else that requires zinc coat steel—there's nothing better than Galvanite*.



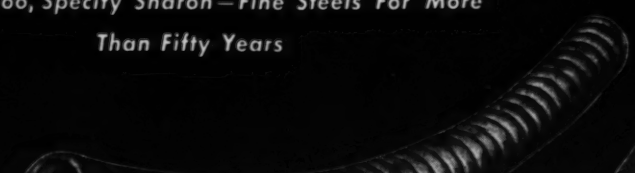


Galvanite Is NOT Shiny

The special patented process employed in the manufacture of Galvanite* gives the steel a grey finish. Do not expect a shiny, tinny appearance. Most products made of Galvanite* are hidden or painted—therefore Sharon makes no attempt to beautify the steel. Only high quality at standard prices are considered in its manufacture.

* T. M.

For Quality Electrical Sheet, Stainless, and Special Alloys, Too, Specify Sharon—Fine Steels For More Than Fifty Years



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Sharon, Pennsylvania

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Is your Profit Curve lagging

THIS NEW STEEL
MAY HELP YOUR PROFIT CURVE, TOO!

Are your equipment and parts such that you can use higher speeds and longer tool life? Then it will pay you to investigate Union Drawn's new Bessemer Screw Steel —B-1113-X. A Union Drawn Metallurgist will be glad to tell you all about it.

behind your Production Curve?

. . . maybe it needs this improved

MACHINABILITY

● It sometimes happens! A robust parts production curve climbs steadily . . . but in spite of every remedy at hand, the profit curve develops anemia —just doesn't have the stuff to make the grade.

Is *your* profit curve as healthy as it might be? Maybe *it* needs the same "shot in the arm" that has helped other parts producers—the kind of MACHINABILITY that has made Republic Union Cold Drawn Steels famous.

Yes, famous—and for very good reasons! At Union Drawn the first and foremost aim of metallurgists and engineers always has been MACHINABILITY—*uniform* MACHINABILITY.

Little wonder, then, that these men know so much about this vital factor in the mass production of steel parts . . . and how to produce steel bars that cut equally well whether shipped today, next week or next year.

If you've never used Republic Union Cold Drawn Steels, here's what you can expect: 1. Uniformity throughout bar after bar and shipment after shipment. 2. A remarkable freedom from tool-wearing abrasive elements. 3. Smooth, bright machined surfaces. 4. Top production efficiency. 5. Low unit costs. All of which stimulate the profit curve.

Now—how to apply all this to your own operations to get the most out of it? Just ask us to put Republic metallurgists and engineers to work for you. It's their job to see that you use the right steel in the right way—to help you get that profit curve back up where it belongs. Call your nearest Republic District Sales Office—or write us.

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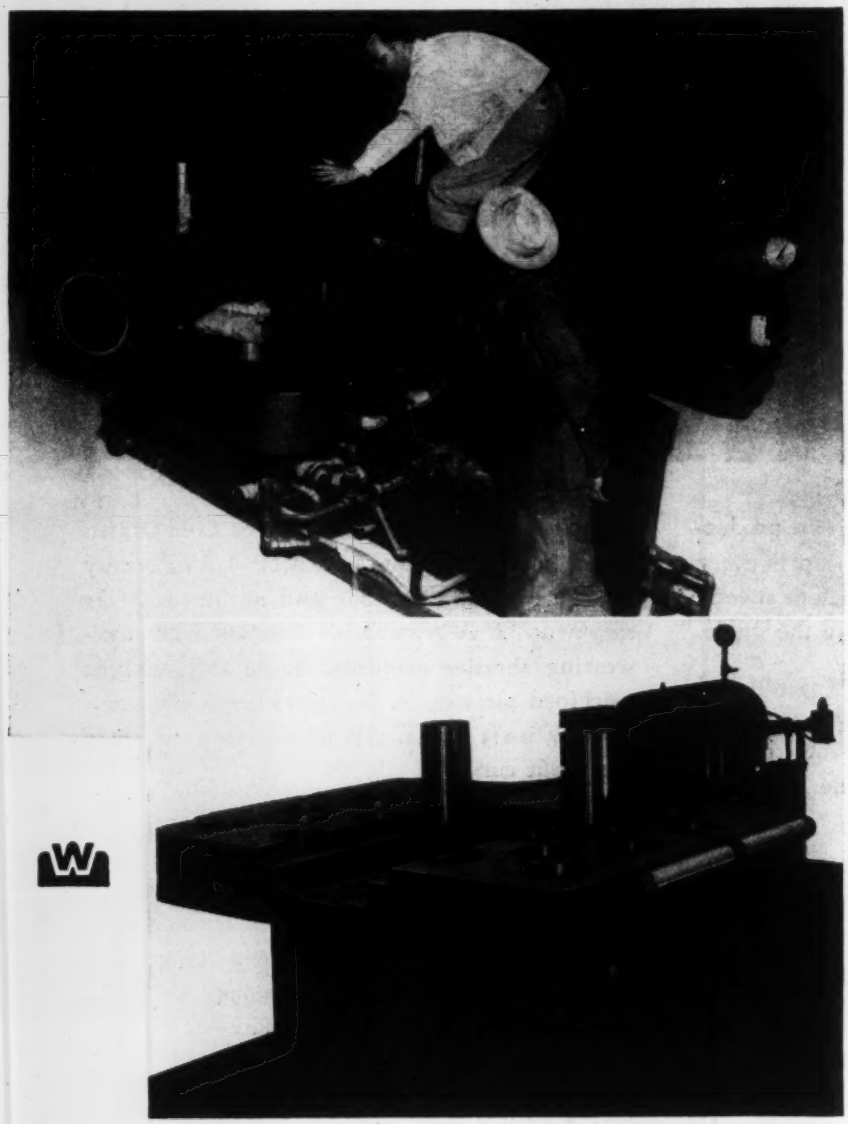
for curving large pipes, beams and shapes



WILLIAMS-WHITE pipe and miscellaneous benders consist of hydraulic horizontal rams, operating a crosshead which slides on a steel plate table. Table has holes for die support pins. A completely self-contained unit operated by hand lever or foot control.

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LETTERS
TO THE EDITORS

Material for Pickling

We have a problem on hand for ventilating tanks where pickling is done. Sulphuric acid 25 per cent at 150° F, also muriatic acid of 75 per cent concentration are used. I understand that Duriron is the proper thing to use. Please advise who the manufacturers are making sheets that are workable for forming.

Samuel Farber
Farber Co., Pawtucket, R. I.

• *We suggest you write to Duriron Co. Inc., 450 Findlay St., Dayton, O., developer of the material you mention, along with several others. To the best of our knowledge, all are cast materials, but Carpenter Steel Co., Reading, Pa., makes a wrought form of one of the alloys. You might also contact some of the manufacturers of stainless steel sheets.*

Importance Brings Request

During the last few years the use of oxygen in the melting of chrome-nickel stainless steels has been developed to the point of large scale operations. We are interested in this method and will appreciate receiving reprints of articles published in your magazine on the subject.

H. S. Schaufus, Crum Lynne Division
Pittsburgh Mill Steel Co. Inc., Crum Lynne, Pa.

• *Material on the subject appeared in STEEL for Dec. 2, 1946, page 140, May 2, 1947, page 107, and June 23, 1947, page 106.*

Worried About Tires?

While it might theoretically be an academic question, nevertheless I seek your opinion on the following: Under Allocation Order R-1 as amended Aug. 25, 1950, supplies of rubber will be so short that production of automobile tires must be curtailed. How can we expect a sufficient number of automobile tires to match the production of automobiles in the last quarter of 1950?

A. T. Dalton, Sales Manager
Chicago Wheel & Mfg. Co., Chicago, Ill.

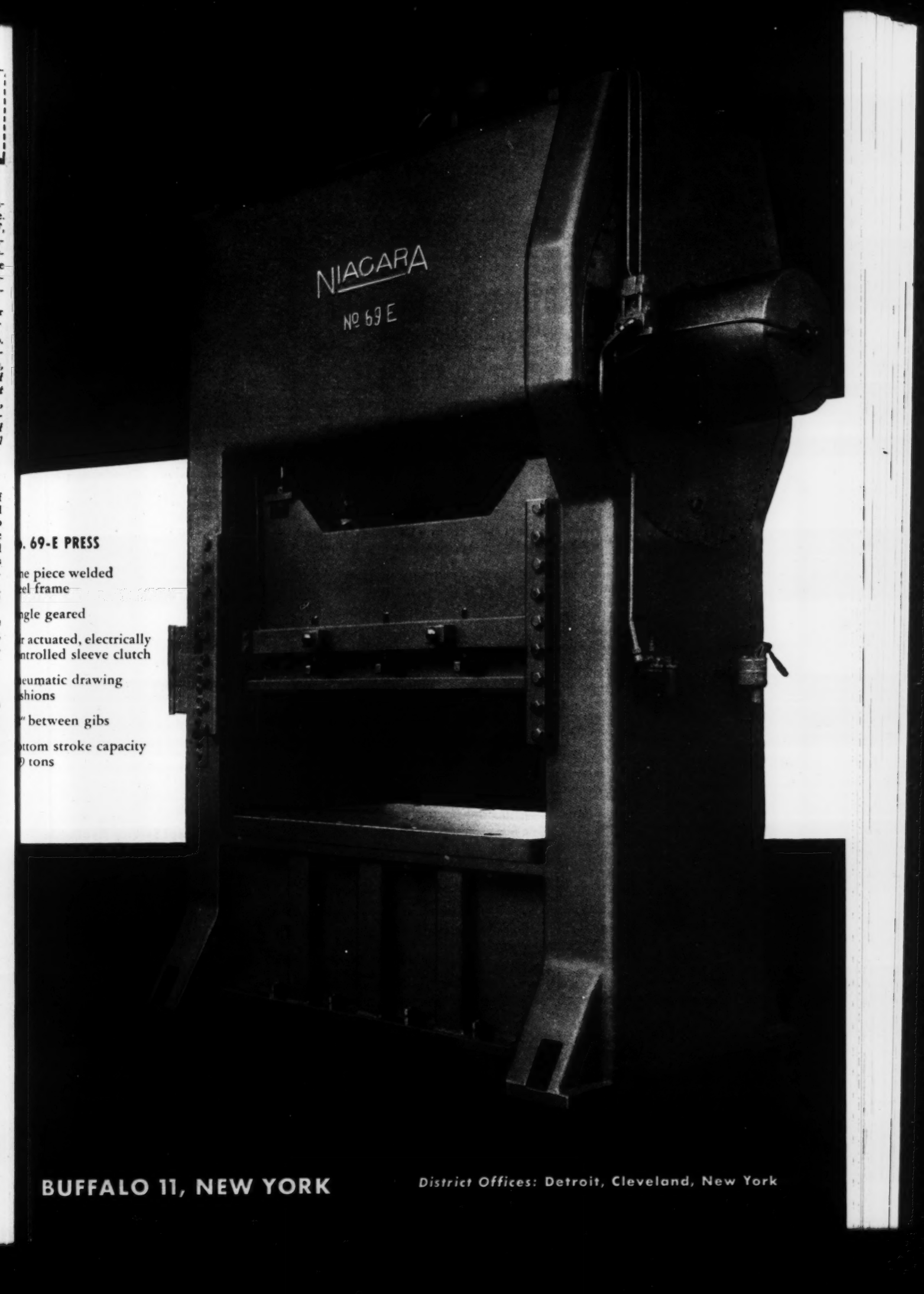
• *Users are restricted, during the last four months of this year, to one-third of their consumption between July 1, 1949 and June 30, 1950. As consumption was at a high level during that period, the cut-back should not be too serious. With sagging car output expected during September and October, and possibly continuing into November and December, with model changeovers, not much thought is being given to elimination of spare tires. The feeling is that the restriction may be temporary to permit building up a natural rubber stockpile.*

Rails into Merchant Shapes

I am interested in obtaining information on the rolling of rails into angles, bars, tubing, etc. Do any articles you have published cover this field of steel production?

R. H. Dewey
Memphis, Tenn.

• *Best source of this information is Rail Steel Bar Association, 38 S. Dearborn St., Chicago 3, Ill.*



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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How NITROGEN Refines Grain Size...

Produces Harder, Stronger, Tougher Chromium Steels

When nitrogen is added to high-chromium steel, it greatly refines the grain size of the metal and materially increases its strength, toughness, hardness, and wear resistance—without sacrificing ductility or reducing corrosion resistance. For these reasons, nitrogen-bearing chromium steels are well suited for cutlery, turbine blades, and various machinery parts that are subject to extreme wear.

Added to Steel In Ferrochrome

Nitrogen is usually added to chromium steels in the form of nitrogen-bearing ferrochrome containing 0.75 per cent and up of nitrogen, 70 per cent chromium, and a maximum of 0.10 per cent carbon. Depending upon the chromium content of the steel, which can range between 12 and 30 per cent, the nitrogen content may vary between 0.06 and 0.20 per cent. The amount of nitrogen added to high-chromium steels should be 1 part of nitrogen to between 100 and 200 parts of chromium, depending upon the chromium content of the steel.

Nitrogen-bearing ferrochrome is added to the furnace in the same manner as ordinary ferrochrome. Nitrogen recovery will average about 90 per cent.

Improves Cutlery Steel

Cutlery steels and other martensitic stainless steels, such as the 12 to 14 per cent chromium low-carbon steels that are used for turbine blades, are hardenable by heat-treatment. Hardenability and strength increase with the carbon content. And, since nitrogen is a more powerful austenite-former than carbon, it is sometimes used as a substitute for part of the carbon, or as a supplement to the carbon, to increase the strength and hardenability of these steels.

Nitrogen has distinct advantages over carbon for this purpose because ductility, toughness, and corrosion resistance are retained when nitrogen is added to steel. It increases the hardness of cutlery steels without detrimentally affecting toughness or corrosion resistance. The effect of small additions of nitrogen in increasing the hardness of cutlery steels is shown in the table below.

Reduces Grain Growth During Hot-Working

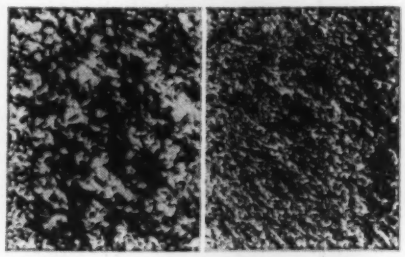
The ferritic high-chromium stainless steels to which nitrogen is added have a finer grain size than ferritic steels without nitrogen, which are comparatively coarse-grained. These include the 16 to 18 per cent chromium wrought steels, high-chromium steels containing small percentages of nickel, and both the cast and wrought 20 to 30 per cent chromium steels. The function of nitrogen when added to the ferritic high-chromium steels is to preserve a fine grain size.

The nitrogen-bearing, high-chromium wrought steels are more readily rolled and forged than comparable steels containing no nitrogen, because grain growth is inhibited during hot-working operations. Greater yields are therefore obtained in rolling and fabricating. Also, strength and toughness are increased as a result of the grain refinement caused by the nitrogen addition.

Effect of Nitrogen on the Hardness of Cutlery Steels*

% Cr	% C	% Si	% Mn	% Mo	% N	Rockwell C Hardness	Brinell Hardness Number (by conversion)
13.15	0.12	0.30	0.38	...	0.03	41	387
13.25	0.13	0.29	0.42	...	0.10	48	460
13.36	0.23	0.28	0.40	...	0.03	46	437
13.27	0.21	0.34	0.32	...	0.08	51	496
12.70	0.32	0.30	0.37	...	0.04	50	484
13.41	0.35	0.31	0.41	...	0.11	56	560
17.37	0.41	0.32	0.41	0.75	0.036	41	382
17.25	0.44	0.30	0.42	0.75	0.09	53	522
17.30	0.66	0.29	0.38	...	0.03	51	496
17.08	0.60	0.31	0.40	...	0.11	55	547
17.26	0.80	0.28	0.39	0.76	0.032	52	509
17.25	0.80	0.27	0.45	0.74	0.09	57	573

*Steels oil-quenched from 950°C. Held 5 hr. at 200°C. and air-cooled.



Note the extent to which nitrogen refines the grain size of those specimens containing about 27 per cent chromium and 0.35 per cent carbon. The specimen at the left contains 0.05 per cent nitrogen; the one at the right, 0.30 per cent nitrogen.

Greater Strength for Austenitic Steels

Small percentages of nitrogen will increase the yield point and tensile strength of the austenitic chromium-nickel steels. These include the well-known 18 per cent chromium, 8 per cent nickel steels, and also the 25 per cent chromium, 12 per cent nickel steels. The improvement in strength is gained at no sacrifice of workability. Furthermore, nitrogen promotes the formation of austenite.

Metallurgical Service Available

ELECTROMET nitrogen-bearing ferrochrome is furnished in the following standard analysis:

Chromium.....67 to 71%
Carbon.....0.10% max.
Silicon.....0.30 to 1.00%
Nitrogen.....0.75% approx., or higher if desired.

It is available for immediate shipment in lump sizes of 25 lb. by 8 mesh, or 15 lb. by 8 mesh; also, in a crushed size of 2 in. by down.

If you would like additional information about the production of nitrogen-bearing steels, ask to have one of our metallurgists call, or ask for the booklet, "Nitrogen In Chromium Alloy Steels." Write to the address given above or to the ELECTROMET office nearest to you. Offices are in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York and San Francisco. In Canada: Welland, Ontario.

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Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Metalworking Yearbook issue $2.00. Copyright 1950 by the Penton Publishing Co.

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 127 NO. 14 OCTOBER 2, 1950

NEWS

★ Letters to the Editors 8
★ As the Editor Views the News 47
★ News Summary 51
After Korea—What? 53
Steelworkers in Hurry for Wage Talks 55
Found: Good Ideas for Steel Plants 57
Continuous Casting Try-Out: Three Buy In 58
Carnegie Develops a Stainless for TV Tubes 59
★ Windows of Washington 60
European Steel Shortage More Severe 63
More Room for Tinnerman's Speed Nuts 64
★ Mirrors of Motordom 67
★ The Business Trend 70
★ Men of Industry 74
★ Obituaries 79

PRODUCTION-ENGINEERING

★ Production and Engineering News at a Glance 81
You Can Make Tool Design More Effective 82
Pendulum-Suspended Milling Unit Restores Wheel Contour 85
"Full Polishing" Stainless Sheets Eliminates Trimming Loss 86
Accurate Piercing Keeps Assembly Line Moving 87
Are You Overlooking Ferromagnetic Analysis? 88
Temporary Welding Setup Solves Small Lot Problems 94
Force Indicator Simplifies Spring-Operated Mechanism Design 96
★ Progress in Steelmaking—Mill Roll Blasting Reduces Operating Costs 98
Well-Designed Oil Holes and Grooves Improve Bearing Lubrication 104
New Plastic Provides "Internal Vision" of Machine Stresses 106
Vanadium Now Available Commercially 108
★ Calendar of Meetings 109
New Products and Equipment 111
★ Helpful Literature 117

MARKETS

★ Market Summary 119
★ Metal Prices and Composites 120
Upward Pressure Still on Prices 126
★ Metalworking Briefs 142

★ *Denotes regular features*

Advertising Index—Page 150. Editorial Index available semiannually; STEEL also is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18

Next Week ... **Power Brushing Deburrs Gears Ten Times Faster ... Aircraft Designers Look to "Newer" Structural Metals ... Stud Welded Open-Hearth Doors Effect Cost Savings ... What Metalworking Thinks About Depreciation and Re-equipment Reform**

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October 2, 1950

Crisis at Home

Brilliant victory of United Nations' forces in Korea under the excellent direction of General MacArthur eases one phase of the problem of Russian-sponsored aggression much more quickly than most observers had expected. The speed and decisive manner with which the tables were turned against the enemy may cause the planners in the Kremlin to think twice before launching another act of aggression.

While the free nations of the world may hope that this will prove to be true, they cannot count upon it. Instead they must go ahead with the program of strengthening their defenses in Europe and Asia. To relax their vigilance because of the initial victory in Korea would be foolhardy.

This line of thinking will lead to difficult problems here in the United States. It goes without saying that the American public supports wholeheartedly the idea of increasing our strength to meet another challenge like that of Korea, should it occur. But without the stimulus of an actual emergency, it will be difficult for the people to become enthusiastic about the sacrifices that should be made to support our preparedness program.

This difficulty will become apparent almost immediately in certain details of industrial mobilization for defense. There will be a disposition in many quarters to question the advisability of going ahead with the authorized controls on inventories, allocation, prices and wages when no seemingly tangible emergency exists.

Persons who take this view should remember that we have right here at home an emergency almost as frightening in its implications as another invasion by Russia in Europe or Asia. Our domestic emergency is inflation and it is serious. The money that would have bought 1000 military planes when the Reds attacked South Korea will buy only 770 planes today. The cost of most other necessities for war has increased proportionately. We are in a rat race to increase wages and prices before the lid of controls is clamped down tight. All of this has happened in three short months and before actual production of war goods on a sizable scale has started.

Now that victory is in sight in Korea, the nation should re-survey its major problems. Certainly the threat of inflation deserves a higher priority rating.

* * *

ENGINEERS PREPARED: Visitors to the annual convention and show of the Association of Iron & Steel Engineers in Cleveland last week found answers to the question, "What's new in the steel industry?" They witnessed or heard enough to reassure them that from the standpoint of technology the industry is prepared to meet any reasonable challenge.

The engineers of the steel industry are on the spot every minute. It is their responsibility to keep abreast of every new development which has any promise of improvement in quality of product or reduction of cost of production. That they are alert to this obligation is proved by the numerous experimental projects that are underway in the industry today. It is no exaggeration to say that more pilot installations are being tested out in the steel industry at this moment than at any time in its history. Some of them will turn out to be duds, but many will lead the way to new engineering progress.

Much of this progress in a qualitative sense is

(OVER)

AS THE EDITOR VIEWS THE NEWS

important from the quantitative angle. The steel industry is plagued by critics who say steelmakers are reluctant to add the new capacity that world conditions justify. The industry is adding new capacity at a gratifying rate. In addition it is constantly finding new methods of increasing substantially the ability of existing facilities to turn out greater tonnage of better steel. This is an accomplishment that should not be underestimated. —p. 57

* * *

FOR HUMAN PROGRESS: Another philanthropic foundation based upon the success of the private enterprise system comes into being to supplement the fine accomplishments of the Carnegie, Rockefeller and numerous other privately sponsored public services. It is the Ford Foundation, supported by a quarter-billion dollar endowment plus more than 3 million shares of nonvoting Ford Motor Co. Class A stock.

The objectives: 1. World peace. 2. Promote basic principles of freedom and democracy. 3. Advance economic well-being of people everywhere. 4. Strengthen, expand and improve educational facilities. 5. Increase knowledge of factors which influence or determine human conduct. Slated to direct this ambitious program is Paul G. Hoffman, one-time Studebaker president who recently resigned from his post as ECA administrator.

With unprecedented resources, a worthy cause and an experience-proven competent director, the Ford Foundation has a golden opportunity to write a bright new chapter in the annals of enlightened philanthropy. —p. 56

* * *

A BIT OF GOOD NEWS: It would be terribly cruel to stimulate false hopes for an improvement in steel supply, yet officials in the new National Production Authority honestly believe that many non-priority consumers will be pleasantly surprised by getting more steel in the fourth quarter than mills have agreed to ship them.

The NPA explanation is that mills, in order to prepare themselves to fill large military orders, advised customers that their fourth-quarter shipments would be cut. Now it turns out that the military will need less than 700,000 tons in the last quarter.

NPA figures that a civilian consumer normally receiving 300 tons of sheets a quarter and who was tentatively scheduled to receive only 175 tons in that period, may actually receive as much as 200 or 225 tons. There are thousands of steel buyers who hope NPA's hunch is correct. —p. 60

* * *

PASSES 1949 OUTPUT: Motordom probably has passed the peak of its best spurt of high production in its history. Last week automobile output since the beginning of the year mounted to more than the 5,126,000 total for all of 1949. This means that last year's substantial volume has been exceeded in less than nine months in 1950.

Automobile manufacturers expect a slower pace in the final quarter. Monthly assemblies may hit 600,000 in October, 500,000 in November and about 375,000 in December, or 1,475,000 for the quarter. These estimates take into account the seasonal tapering off of new car sales near the year-end, the effect of shortages in certain materials and components and the slowing of assemblies in November and December due to model changeovers. If the estimates turn out to be fairly accurate, total output for the year will be 6,600,000—a new record by a handsome margin.

Defense requirements probably will cut into auto output in 1951. —p. 68

* * *

KEY DESIGN TO SHOP: Efficiency engineers discussing problems of tool design applaud the American tool designer for his attention to accuracy, reliability and interchangeability of parts but they contend that tool design falls down in the inability of the shop man to use the designer's tools in the most effective manner.

For instance, consider the method of holding a part in a fixture. If parts are located on studs, the designer should strive for quick and positive action and should not call for closer tolerances than are necessary. If the work is held by clamps, the designer should not specify any more clamps than are absolutely necessary for rigidity and accuracy. To call for more or longer studs or more clamps than are required causes shop men to waste precious time in securing parts. This can run into substantial losses rapidly.

Probably the area in which tool designing can be improved most is in adapting design ideas to the human and practical exigencies of the shop. —p. 82

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

FRACTIONAL WAR—What can you expect in the fractional war economy likely to develop when and if the North Koreans capitulate (p. 53)? Look for a permanently high level of business activity supported by vast defense expenditures as America becomes the arsenal against communism. Resign yourself to more government controls, inflation and shortages in materials and men. Prepare to appraise your business prospects in the light of a new or modified set of half war, half peace conditions that probably will continue for years to come.

HIGH PLATEAU—Industrial stamina is holding as the present full-tilt business pace continues (pp. 70-73). STEEL's industrial production index for the week ended Sept. 23 remained at 219. Last week steelmaking furnaces operated slightly above theoretical capacity for the third consecutive week. Auto and truck production is hovering around 188,000 weekly. Excavating and earthmoving equipment shipments should reach an alltime high of about $567.9 million this year.

WHAT THE TRAFFIC WILL BEAR—Autoworkers and other unionists have won their wage increases so easily that labor leaders are wondering if they asked too little (p. 55). Policy makers of the CIO's United Steelworkers of America are meeting this week to debate that point and to decide on what they'll demand of the 1400 companies they hold contracts with. Rank and file steelworkers are talking about 15 cents an hour. They don't want the GM escalator clause.

INVITATION—National Production Authority has invited officials of 21 steel companies to meeting in Washington Oct. 3 to organize the Steel Products Industry Advisory Committee. The men will be informed on present and anticipated programming of priority steel requirements, particularly for military products. Industry men will do their best at the meeting to hold out for voluntary allocations. Fourth quarter steel needs for the military will not exceed 700,000 tons, a little less than originally estimated by steel producers (p. 60). Hence, steel supplies for civilian consumers in the last three months of the year may be a little easier than expected.

STEEL SHOW—Steelmen got an eyeful last week at the Cleveland show of the Association of Iron & Steel Engineers (p. 57). New developments include a device to hold hot strip steel to desired width as it speeds off continuous mills, bigger trucks to handle coils and television equipment to aid steel production.

COAL CURE?—The coal industry's research agency, Bituminous Coal Research Inc., will test run a new continuous mining machine in November (p. 59). The project is just one of a number in the industry's $1.2 million development program to improve the competitive position of coal. The mining device has an "extensible shaker-conveyor" that enables the machine to advance up to 300 feet without interrupting the operation.

LESS STEEL IN EUROPE—Don't bank too heavily on solving your steel shortage with European products (p. 63). All but the French are booked nearly to capacity on most items. The lifting of steel controls in Western Germany won't spur exports immediately because the Ruhr as yet isn't in shape to produce much above the old limit of 11.1 million tons a year.

HERE AND THERE IN INDUSTRY—The Korean war, thus far at least, has had only minor effect on industrial production in California (p. 58) . . .Completion of DeSoto's Warren avenue body and engine-building plant in Dearborn, Mich., sharply boosts the capacity of the Chrysler Corp. division (p. 67) . . . Allegheny Ludlum Steel Corp. is acquiring a 35 per cent interest in Continuous Metalcast Corp., a new firm that will own rights to a process for continuous casting of metals (p. 58) . . . Carnegie-Illinois Steel Corp. has developed a new stainless for television tubes (p. 59) . . . Tinnerman Products Inc.'s new Cleveland plant for Speed Nuts isn't big enough, so the firm will use its old plant too (p. 64) . . . Youngstown Sheet & Tube Co. will split its stock two for one to provide wider distribution.

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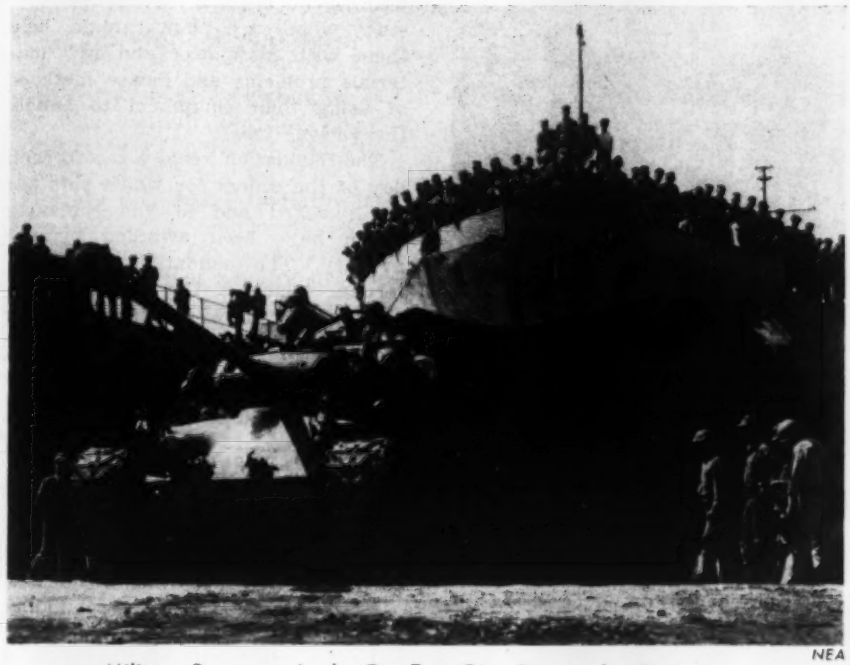

NEA

Military Successes in the Far East Give Rise to the Question—

After Korea—What?

Fractional war economy will hold metalworking output at high level. Larger percentage of production will be required to maintain arsenal against communism

WHAT are the economic prospects for metalworking should the Korean war end soon? What will be major economic characteristics of the fractional war climate likely to develop in coming months?

These and similar questions arise as Korean military operations enter a phase where large-scale fighting might end abruptly. The answers depend to a great extent on the course to be followed by Russian and other Communist countries. If they brandish their sabers, look for a long war, greater material and labor shortages, feverish but government-restricted business activity.

The Meaning of "No"—If the Reds do nothing more violent than vote "no" in the UN, metalworking executives expect:

1. No complete return to pre-June 25 peacetime conditions.
2. A permanently higher level of business activity because the floor will be raised by vast defense expenditures that this year may total $30 billion.
3. A mild slackening in the impetus for industrial mobilization caused by an inevitable psychological letdown.
4. More government controls on industry—particularly allocations—will come, although probably not until after the November elections. Wage and price controls may come after organized labor has completed the current round of wage increases.
5. Inflation will continue. Wages are or will be up nearly 10 per cent. Prices are following as usual.
6. Shortages in materials and men will remain. The military draft and its effects on the labor supply are with us permanently.

Tugs and Pulls—The fractional war climate presents new and modified economic factors for metalworking to consider. Industry will be devoting an increasing part of its energies to military needs, but the majority of its efforts will still go to civilian purposes and be subject to normal economic influences. Peacetime factors, for example, may bring a mild recession right after cessation of Korean hostilities. If recession comes, it will be caused by a psychological letdown as buyers get overly cautious. An abnormally high level of business activity could continue for six to nine months after the recession because the powerful civilian momentum to output generated by Korea will take that long to die down.

A big standing army that may be inactive for long periods won't need large volumes of combat materiel when it's not fighting. Metalworking must learn to appraise that factor.

Armed Truce—International truce will not permit a return to the conditions of peace. The government won't permit it. Commerce Secretary Charles Sawyer says it "is completely unrealistic" to assume that after a brief interval the problems in Korea will be ended and that we can then go back to business as usual. "Regardless of the outcome in Korea," he states, "we have embarked upon a program that will strain our domestic economy. Shortages, heavy taxes and inflation will press us for years to come.

Commerce Plugs Export Leaks

The Commerce Department is holding up all applications to export aluminum, lead and zinc to conserve U. S. supplies. The department is also tightening curbs on exports of railroad equipment and is placing several types of heavy tires and tubes under export control. The action is primarily designed to plug the leaks that permit these items to dribble into the Soviet Union and its satellites.

Isolated Savings from War Effort

The Korean war is costing millions upon millions, but isolated dollar savings are turning up here and there because of it. Orders for magnesium anodes to protect the Maritime Administration's reserve fleet of merchant vessels are held up pending a review of the situation in January of next year.

Congress appropriated $2.2 million to apply cathodic protection to some 2300 idle vessels. Since passage of that appropriation, some 150 ships have been recommissioned and more will be taken out of mothballs for the Korean conflict.

Appliance Output May Drop

Charles E. Wilson, president of General Electric Co., estimates diversion of materials to military production may bring a reduction of 20 per cent in current output of consumer goods such as household appliances.

Some types of appliances will be harder hit than others, he says. Television units, for instance, may be

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BACK AGAIN: Sea Bees of the U.S. Navy, back in service for the first time since World War II, find a new use for the landing mats that were usually used for combat airfields. Stretched over wooden piers at Inchon in South Korea, the mats will speed up landing of supplies by increasing traction and preventing wear and tear from heavy use

reduced more than the average because of greater needs for electronic equipment for defense purposes.

The GE president forecast a 20 per cent reduction in demand for consumer hard goods as a result of the new credit controls invoked by President Truman last month. In effect, Mr. Wilson points out, the reduction in production would just about be offset by the curtailment of demand.

Kropp May Get New Plant

Kropp Forge Co., Chicago, may soon acquire a government-owned forging plant outside of Illinois, Roy A. Kropp, president, discloses. Negotiations appeared to be in the final stage late last week.

Mr. Kropp had hoped to obtain the forge department of the Dodge-Chicago engine plant. The Air Force's designation of Ford to operate the plant quashed that possibility, but Kropp is high on the Military's critical list and will get some help.

Kropp is presently 25 per cent engaged in war work. By the end of the year its officials expect the percentage to rise to 50. Major war contracts are Pershing tank gear blanks, jet engine drive shafts, landing gear forgings, .50 cal. gun barrels and other components.

Present average daily production is in excess of 100 tons of forgings, ranging in weight from 4 ounces to 9 tons.

North American Gets Ohio Plant

North American Aviation Inc. will take over operation of the government-owned aircraft plant at Columbus, O., under an agreement with the Navy.

Curtiss-Wright Corp., the present operator of the facility, will cease operations because of "no requirements for projects." North American will use the plant to meet production requirements that already exceed the capacity of the firm's units in the Los Angeles area. North American will attempt to retain the 1800 workers now employed by Curtiss, and probably will need to hire more.

Bell Aircraft Buys Otis Plant

Bell Aircraft Corp. has purchased Otis Elevator Co.'s Buffalo plant which was built by the government in 1942 and has 114,000 square feet of space. The facility, to be known as the Northland plant, is assessed at $595,000. Bell is expanding operations to meet its war production requirements.

Small Firms Bid for War Orders

The Greater Youngstown Area Foundation is operating a plan to get defense orders for smaller industrial plants in the Youngstown area.

H. E. Johnson, president of the W. O. Strausbaugh Co., is general chairman for the plan. Subcommittees have been set up to handle various phases of the work that includes a complete file on each plant as to its manpower, equipment and background. The subcommittees study what each plant can do, help them with manpower and raw materials problems and devise methods of using their equipment to handle the various jobs.

The foundation keeps a record each day of the orders for which bids are being asked and of the contracts which have been awarded by the military. The foundation tries to determine which of the orders can be handled by local companies with prime or subcontracts.

K-F May Build Ships

Kaiser-Frazer Corp. stockholders will be asked to vote at a special meeting on a proposal that the corporation be authorized to enter the shipbuilding business in addition to its automotive and other businesses.

Kaiser-Frazer has no shipbuilding contracts, but it's asking stockholder approval on a just-in-case basis. K-F has contracted with Geo. F. Sharpe, New York naval architectural firm, to do development, experimental and exploratory work in connection with new types of shipping.

Carnegie Tackles Gray Market

Carnegie-Illinois Steel Corp. customers approve and support measures taken by the U. S. Steel Corp. subsidiary against the gray market, says J. Douglas Darby, vice president in charge of sales.

Among the controls inaugurated by Carnegie is the insertion of new clauses in sales contracts and letters of acknowledgment aimed at forestalling diversion of steel shipments to questionable parties.

Steel Capacity Study To Go On

Adjournment of Congress will not interfere with the steel capacity study of the Senate Armed Services Preparedness Subcommittee, says the subcommittee's general counsel, Donald C. Cook, vice chairman, Securities & Exchange Commission. Object is to determine what amount of steel expansion is required and how soon, how a needed expansion program can be carried out, and if the steel industry has the financial resources to do the job. The study will be based on information on hand in the Commerce Department, SEC and other government agencies. No steel men will be called into hearings, says Mr. Cook.

Steelworkers in Hurry for Wage Talks

Premature reopening of contracts asked by union in effort to obtain increase before wage freeze. Rank and file workers hope for 15-cent raise

LABOR leaders are beginning to feel that the pattern for the current round of wage increases was cut a little too small.

Largely this arises from the lack of resistance by employers to the wage demands. Increases have been won so easily that the unionists almost were taken by surprise. Now they think they might have obtained more.

How Much for Steel?—This attitude will be in evidence this weekend at Atlantic City when the International Wage Policy Committee and the executive board of the United Steelworkers of America-CIO meets to decide its demands against 1400 steel producers and steel fabricating companies with which it has contracts.

The steelworkers union will attempt to get more than the 10-cent increase won by the United Auto Workers, its big rival within the CIO. Most of the UAW unions have signed contracts containing cost-of-living escalator clauses. If the cost of living index rises three to five points by the end of the year, as predicted by the Labor Department, the UAW members will receive further increases of 2 to 4 cents an hour. Rank and file steelworkers are talking about 15 cents an hour. They don't want an escalator clause.

Jump the Gun—The United Steelworkers has notified companies with which it has contracts that it wants to open wage negotiations Oct. 9, a month ahead of schedule. Steel contracts provide bargaining conference shall convene 30 days after Nov. 1. The national interest under mobilization, says President Philip Murray, requires a quick settlement on the wage question.

What's the Hurry?—Steelmakers retort that premature reopening of the wage contracts might set a dangerous precedent.

"Stability of contracts is important to the union as well as to the company," says Clarence Randall, Inland Steel president. "Contracts will lose all significance if it becomes a habit to set them aside."

Unions should learn that "they are bound by the agreement made and for the period it covers," says John A. Stephens, vice president-industrial relations, U. S. Steel. Mr. Stephens says it doesn't make sense to spend hours negotiating and drafting precisely what has been agreed to and then ignore the terms of the contract.

Steelmakers generally are disinclined to meet Mr. Murray's request to speed up wage negotiations. Inland Steel, the first company to reply to the union's request, says it will meet with the unionists "but it will be for the purpose of hearing your reasons why our contract should be reopened prematurely."

Could Mean Price Rise—Generally, steel company representatives are reluctant to express their attitude toward the probable wage demands by the union. They point out that a large wage increase would necessitate upward revision of prices. And the steel men would like to hold prices down.

Mr. Randall reminds Mr. Murray that the Bureau of Labor Statistics index on the cost of living stands at 173.0, as compared with 173.7 in July, 1948, when the current wage contract was signed.

Alcoa Grants Increase — Fuel for the steelworkers' wage demands was given by the award of a 10 per cent increase in basic wage rates by the Aluminum Co. of America to the United Steelworkers. This is estimated by the union as the equivalent of a little more than 14 cents an hour on the average.

The union men accepted the Alcoa offer, but say it really isn't enough. They say they will be back later to ask for more.

NEA

JOHN A. STEPHENS
"...contract binds for period it covers"

Jamaicans vs. Puerto Ricans

The Labor Department is cool to suggestions from some segments of the foundry industry that Jamaicans temporarily in this country as farm workers be permitted to stay to work in foundries.

American labor officials aren't opposed to recruiting workers outside continental U. S. if conditions warrant the step, but they favor Puerto Ricans who are already U. S. citizens.

Wage Fixing at the Back Door

Watch Labor Department rulings on applications of the Walsh-Healey Act, which permits the secretary of labor to set minimum wages for employers contracting with the government to furnish supplies and materials in excess of $10,000. Increasingly, the department is using this back-door method of minimum wage fixing now that military buying is increasing.

How To Avoid Strikes

How can you avoid strikes in your plant? National Planning Association tells how Marathon Corp., a Wisconsin paper manufacturer, turns the trick even though it must deal with seven unions representing about 3000 workers.

The NPA case study is the eighth in the series, "Causes of Industrial Peace Under Collective Bargaining," and can be obtained from the asso-

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PHILIP MURRAY
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ciation at 800 21st St. NW, Washington 6.

Ohio Firm Adopts Pension Plan

Youngstown Steel Door Co., Youngstown maker of railroad car parts, has adopted a pension plan for its 1200 employees, based upon the Bethlehem plan.

That provides $100 a month minimum pensions for those with 25 years of service and reaching the age of 65, and lesser pensions for those with shorter service. Social security payments are deductible. Youngstown Steel Door's former social welfare plan was paid for jointly by the company and the workers.

The firm has added about 300 men to its force recently and could use another 150 more. Company executives say they are swamped with railroad business.

Woman's Place: In the Shop

The woman welder is back in the Youngstown area.

Training of a class of 14 women student welders has been started at the Commercial Shearing & Stamping Co. plant, under the adult education program of the Youngstown public schools. Once they finish training, the women will be given jobs. During World War II, about 10,000 women held down jobs in Youngstown steel and fabricating plants.

Coke Oven Orders Placed

New coke ovens are being ordered by two companies.

Geneva Steel Co., a United States Steel Corp. subsidiary, awarded Koppers Co. Inc., Pittsburgh, a contract for construction of a battery of 23 coke ovens at its Ironton plant near Provo, Utah, and Sloss-Sheffield Steel & Iron Co. announced early construction of 30 new ovens at its operations at North Birmingham, Ala.

The new battery of Koppers-Becker ovens, gun flue type, for Geneva Steel will have a carbonizing capacity of 600 net tons of coal per day.

The new ovens that Sloss-Sheffield will buy will cost more than $2 million and will increase the company's coke capacity to about 70,000 tons a month.

Sloss-Sheffield let a $750,000 contract for new steam generating equipment for North Birmingham and a $400,000 contract for a new turboblower for its City furnaces at Birmingham. These, with the new office building now under construction, bring the company's current modernization and expansion program to about $3.5 million.

No Show for Trailer Coaches

No show is the answer the Trailer Coach Manufacturers Association has come up with because of supply shortages.

The association was to have held its fourteenth annual national show in Cleveland early in November but with trailer manufacturers carrying a tremendous backlog of orders and facing critical shortages of materials it was felt that going into a show and making additional commitments would not be good business.

Most critical shortages of materials for trailer coach manufacturing are reported to be in sheet aluminum, sheet steel, copper tubing, and plywood flooring.

To The Rear, Hup!

Defense is working on the problem of going forward backwards. High-strength plane seats that face aft are being installed in aircraft of the Military Air Transport Service because studies prove that passengers riding backwards can withstand greater shock. The new seat is made of aluminum sheet rather than steel tubing.

No Fifth Tire for Cars?

Government agencies are being urged by some groups to expand the government order limiting the use of new rubber to include the elimination of the fifth tire on new cars. They say their proposal would release more new rubber for the national stockpile, and a tire dealers' association has pointed out it would give recapping sales a substantial boost and increase new and used tire demand.

Although federal government agencies have not indicated as yet that they are contemplating such a ban, Reconstruction Finance Corp. ordered all-out synthetic rubber production by the government's rubber-making plants. The order is calculated to boost the total U. S. output of general-purpose synthetic substantially. The original rubber limitation order restricts users of natural rubber for the four months September-December to one third of their total consumption for the year ending June 30, 1950. By the end of the year it is felt the government stockpile may have been built up to the point where some relaxing of curbs will be possible, granting the military situation does not worsen.

Ford's Five 'Areas of Action'

Quarter-billion dollar Ford Foundation, bulwarked by over 3 million shares of nonvoting Ford Motor Co. Class A stock has announced five preliminary "areas of action" in the field of philanthropy. They were decided upon after the board of trustees boiled down 16 volumes of suggestions offered during the past two years by over 1100 persons. They include supporting activities that: 1. Promise significant contributions to world peace. 2. Secure greater allegiance to the basic principles of freedom and democracy in the solution of the problems of an ever-changing society. 3. Advance the economic well-being of people everywhere and improve economic institutions for the better realization of democratic goals. 4. Strengthen, expand and improve educational facilities and methods to enable individuals more fully to realize their intellectual, civic and spiritual potentialities. 5. Increase knowledge of factors which influence or determine human conduct.

Slated to head the world's largest private foundation in these human and sociological efforts is Paul G. Hoffman, recently resigned as ECA administrator and one-time president of Studebaker Corp. He will be named officially probably in November at the next meeting of trustees and will receive $100,000 annual salary.

Essence of the trustees' decisions was to leave other great philanthropies to their selected areas and embark on an uncharted sea to advance human welfare. Unless the board decides otherwise from time to time, grants from the foundation will be announced only by the recipients if they so choose. Headquarters likely will be moved from Detroit to New York.

Tube Maker Cuts Product Line

Growing scarcity of semifinished steel forced Pittsburgh Tube Co. to notify its customers last week of intention to discontinue production of black and galvanized standard pipe at the end of this year. Company's output after that date will be limited to buttweld and cold drawn mechanical tubing.

Commercial To Build Utah Unit

Commercial Shearing & Stamping Co., Youngstown, is planning to build a $1.5 million plant in Salt Lake City. The firm manufactures tank heads, boiler heads and water heater and cooler parts. The plant would consume hot-rolled sheets from the nearby Geneva Steel Co. mill.

Found: Good Ideas for Steel Plants

Look them over. Maybe some will help you too. They were among the highlights of the exposition held in conjunction with AISE convention

WHAT'S NEW in the steel industry? Plenty!

That's what visitors to the annual convention of the Association of Iron & Steel Engineers found last week in Cleveland. On every side—at the convention sessions and at the exposition—new ideas abounded. While the ideas coming out of the technical sessions were in many cases of an abstract nature the ideas offered by the displays of equipment makers were of a more tangible variety.

Keeps an Eye on It—One of the displays—by General Electric Co.—was a new device to hold hot strip steel to desired width as it speeds off continuous mills. An electronic device, this new gage does not come into contact with the hot strip but has two detector heads that respond to the illumination from the hot strip. The detector heads are mounted several feet above the hot strip; when strip passes under the detector head, its actual deviation from the width set by the operator is "seen" by the two electric eyes and translated into fractions of an inch on a deviation indicator. A permanent record of the width variation can be had by adding a paper tape recording device.

Money Maker—By helping mill operators hold strip closer to the desired width, the new gage reduces the amount of steel that must be sheared off. By lowering the scrap loss the gage not only pays for itself soon but offers the possibility of a high return on the investment.

Other developments for strip mills are bigger and bigger industrial trucks to handle coils. Maximum load that now can be lifted is reported to be 80,000 pounds. Sixty thousand pounds had been the limit. Growth of the giants results from metalworking companies' demand for bigger coils that permit longer runs in automatic machinery.

This demand for bigger and bigger industrial trucks poses many problems for their makers. One is keeping them small and mobile while building in enough weight to prevent them from tipping over. One producer of electric trucks—Baker-Raulang Co.—showed how it had built in 350 pounds as an additional counterweight in one of its small industrial trucks; it got this additional weight by adopting a relatively heavy forging for its trail axle.

Something Old, Something New—Three old products made in new ways were displayed by American Brake Shoe Co. They were copper bosh plates and copper tuyeres for blast furnaces and copper electrode holders for electric steelmaking furnaces. Instead of being cast in the conventional one piece, each of these three products is being cast in two pieces and welded together. This method permits American Brake Shoe to make visual inspection of the interiors or cells where water will flow for cooling purposes when the bosh plates, tuyeres, or electrode holders are in use.

A pocket-size item drawing attention far out of proportion to its size was a German-made hardness tester. Called a Sklerograf and about the size of a fountain pen, this tester shows the hardness of a metal by the height to which a plunger bounces after being dropped onto the material being tested. Sale price, $65; seller Kurt Orban Co. Inc., New York.

Lubrication by Mist—Alemite Division of Stewart-Warner Corp., Chicago, demonstrated the new oil mist lubrication equipment it will start delivering in November. The system is expected to find many applications on industrial equipment, including machine tools and presses. Oil in mist form is circulated through piping to each bearing.

Indication of the modernity of products on display at the iron and steel engineers exposition was a demonstration of television and what it can do for industry. Known as wired television because wires transmit images from camera to receiver, this equipment was displayed by Diamond Power Specialty Corp., Lancaster, O. This television equipment, the company points out, brings pictured information from danger points, keeps an eye on production processes, or helps in other ways to cut costs.

Another product to increase safety was the new goggle plate valve displayed by the Edgar E. Brosius Co. Inc. The Pittsburgh company emphasized the ease of operation and positive action of this valve for use in gas distribution or handling systems around plants.

A CENTER OF ATTENTION: MILL IN MOTION AT AISE SHOW
. . . Mesta displays model of cold mill it built for J. & L.

AISE Elects Officers

John F. Black, assistant general superintendent at East Chicago, Ind., for Youngstown Sheet & Tube Co., succeeds A. S. Glossbrenner as president of the Association of Iron & Steel Engineers.

He and other officers were elected last week at the association's annual meeting in Cleveland.

Other officers are: First vice president, I. N. Tull, electrical superintendent, Republic Steel Corp., Cleveland; second vice president, John L. Young, vice president in charge of engineering, National Tube Co., Pittsburgh.

Treasurer is E. L. Anderson, electrical superintendent, Bethlehem Steel Co., Johnstown, Pa.; and secretary, John H. Vohr, general superintendent, Carnegie-Illinois Steel Corp., Gary, Ind.

Korean Effects Minor

Only 10 per cent of California firms have received direct war orders. Indirect effects larger

THE KOREAN war, thus far at least, has had only a minor effect on industrial production in California.

A survey of 300 manufacturers by the California Manufacturers Association shows only 10 per cent of the companies have received direct orders from the federal government as a result of the war, although another 30 per cent have received some orders indirectly, through subcontracts.

Minor Dislocations—Nearly four-fifths of the companies surveyed reported they could meet the war needs by diverting only a minor portion of their capacity to war production. Nor do these companies foresee any sharp increase in military business in the near future. Less than 20 per cent of the concerns expect to receive new orders in the fourth quarter.

Among the industries covered by the survey were the steel, aircraft, food processing, auto assembly, tire and rubber, engines, paint, accessories and equipment.

Better Take-off—Should the shooting war expand into a wider conflict, California's manufacturing industries will be in a better position to shift to war production than it was at the beginning of the last war.

Another survey made by the manufacturers association shows almost 90 per cent of the state's productive capacity is more effective than during World War II. Most of these plants have increased capacity, ranging up to 5000 per cent since the end of the last war.

Improvements in manufacturing processes have made their operations more efficient.

The poll also showed that about 80 per cent of California's manufacturers could shift to a full war basis with little or no delay or conversion of facilities.

Lots of Jobs—Employment in California, spurred by the high level of civilian goods production and war work in aircraft and shipbuilding industries, reached a new peak in August and probably continued to expand in September.

Sunny Outlook in California

A poll of some 300 manufacturing companies in California indicates a continued high level of operations for the state's industry during the remainder of 1950.

About 76 per cent of the firms surveyed expect an increased volume of business during the fourth quarter this year, while 19 per cent think their sales will be at least equal to third quarter volume.

The majority of this upturn will be due to a high level of civilian demand, the survey indicates. Only 19 per cent of the manufacturers expect an appreciable amount of government business in the fourth quarter.

Increasing production will be reflected in higher employment. Some 54 per cent of the companies expect to increase payrolls, while another 42 per cent look for no change in employment.

Manufacturers payrolls at the end of August totalled 842,100, an increase of 78,000 for the month. This number is 94,000 more than in August last year and tops the September, 1948, record by 37,000.

Wide World

REPLACEMENT WINGS: F-84 Thunderjets of the U.S. Air Force's 36th Fighter-Bomber Wing line the apron at Furstenfeldbruck Air Base in Germany. The sleek new jets, armed with six 50-caliber machine guns and rockets, will replace the wing's F80s

Atlas Steels To Get Cold Mill

A mill to cold reduce stainless steel sheet is to be installed by Atlas Steels Ltd. at its North plant at Welland, Ont., Canada.

This new mill, which will enable Atlas to expand its line of products, will be of a size to complement production of the hot mill installed this year to roll stainless.

Demand for output of the new hot mill has been far beyond expectations and it has been necessary to put it on a three-shift, 24-hour basis.

Ground for a plant addition to house the new cold mill has already been broken. Installation of the new machinery is expected to be completed within six months.

Continuous Casting Tried

Allegheny Ludlum, American Metal, Scovill get 55 per cent interest in new firm

ALLEGHENY Ludlum Steel Corp. is acquiring a 35 per cent interest in Continuous Metalcast Corp., a new firm that will own rights to a process for continuous casting of metals.

American Metal Co. Ltd., New York, a custom smelter and refiner of nonferrous metals, and Scovill Mfg. Co., Waterbury, Conn., a brass producer, each will have a 10 per cent interest in the new firm. The other 45 per cent of the stock goes to Irving Rossi, owner of the continuous casting process and a related process. He transfers his rights with respect to the processes in the U. S. and Canada to the new company.

Let George Do It—The business of Continuous Metalcast Corp. will primarily be to license others to use its processes for the continuous casting of metal. The technique has been on a commercial basis in production of brass and to a limited extent for certain types of copper.

Allegheny Ludlum will pay Mr. Rossi for its 35 per cent interest in the new company with 10,000 shares of Allegheny stock and a royalty of $5 a ton for each ton of useable steel continuously cast on a commercial basis by use of a continuous casting machine. Those payments will continue until they aggregate $100,000 or until the expiration of five years from formation of the new corporation. Mr. Rossi will pay $187,500 as partial reimbursement for development work Allegheny has done. Since early 1949, the Brackenridge, Pa., steel producer has carried on development work to make steel by continuous casting.

Cincinnati Milling Expands

A new factory to supplement machine tool production will be erected in Wilmington, O., by Cincinnati Milling Machine Co., says Frederick Geier, president. Since recreation facilities and parking lots will be retained for employees, the company decided to build the new plant within easy reach of Cincinnati on a site just outside Wilmington. Construction should start immediately. Mr. Geier also outlines these other expansion moves:

Formation of Cincinnati Milling Products Division to direct production of a chemical cutting compound, Cimcool, and production and sale of a new type of precision grinding wheel.

Moving of Carlisle Chemical Works

Inc., a Cincinnati Milling subsidiary, to its new plant at Reading, O.

Acquisition of E. W. Wynn Ironfounders Ltd., at Cannock, England, to supply castings to the milling machine company's British affiliate.

Carnegie Develops a Stainless for TV Tubes

U. S. STEEL Corp. is officiating at what promises to be a more lasting wedding between steel and glass.

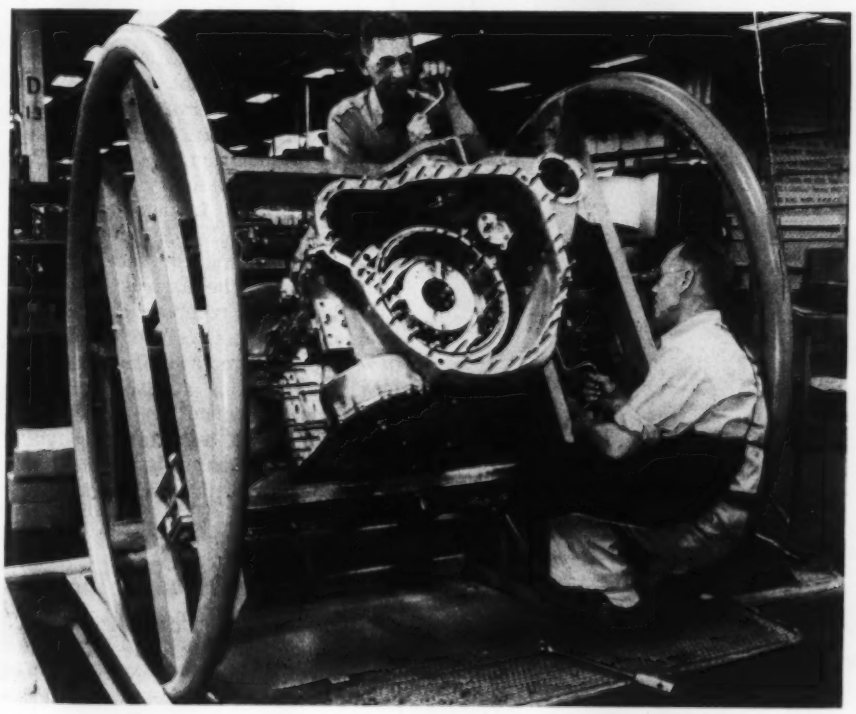
In the manufacture of television picture tubes, a major technical problem has been to achieve a good bond between glass and metal. When heated and cooled, glass and most metals expand and contract at different rates, causing the glass to crack when the two are sealed together.

Solve the Puzzle—A television set manufacturer put this problem in the lap of U. S. Steel's Carnegie-Illinois Steel Corp.: Develop a stainless steel whose rate of expansion and contraction parallels that of glass; develop a steel easy to form and strong enough to withstand the pressures caused by the vacuum inside the television tube. Carnegie began grappling with the problem in December, 1948. It finally developed a new alloy called USS 17-TV. The "17" refers to the approximate percentage of chromium in the stainless.

The new stainless steel makes possible the commercial manufacture of larger, lower-cost, lighter-weight, more durable, rectangular television picture tubes. Successful rectangular screens with over-all areas as large as 325 square inches are now practical.

New Equation—The new stainless is cheaper primarily because it contains less chromium than the alloy first used in a steel-glass bond. Carnegie, in co-operation with tube manufacturers, was able to pare the original chrome content of 28 per cent down to 17 per cent. The 17 per cent chromium alloy answered most of the production and cost problems, but at the high temperatures needed to seal the glass and steel the expansion was too high. To overcome that hurdle, the composition of the steel was adjusted in a long series of trial-and-error runs.

The new steel is formed into the desired TV shape by spinning a disk of metal into a round envelope from which the rectangular tube is produced. The envelope of a television tube acts as a spacer between the cathode-ray assembly and the glass screen on which the image appears.



Courtesy, GM Folks

GM CO-OPERATION: When Allison Division of General Motors had to fill customer orders for automatic transmissions for heavy vehicles like earthmovers, busses, trucks and tanks, it hooked up with the Detroit Diesel Engine Division and developed the Torqmatic to work on big vehicles, many of which are powered by engines from Detroit Diesel. Allison is now the largest producer of hydraulic transmissions for heavy duty equipment in the U.S. Here, two Allison employees work on a 3000-pound "General Patton" tank transmission

Barium's Order Backlog Hits High

Barium Steel Corp.'s unfilled orders exceed $27 million, the largest in the history of the corporation.

A management letter to stockholders on the subject states: "To the best of our knowledge, none of that volume comes directly from government sources." Some Barium subsidiaries are negotiating for government contracts that may change that situation.

Coal Machine Ready

Another continuous mining device will be ready for a trial run early in November

A NEW continuous mining machine being developed by the bituminous coal industry's research agency is ready for a trial run in November.

The device is one of several projects of Bituminous Coal Research Inc. which in 1951 will spend more than $1.2 million to study coal markets and to develop improved mining equipment and methods and better coal utilization.

Revolution in Coal?—BCR's Mining Development Committee has been working for about two years on a machine that will mine coal continuously and eliminate the use of explosives. Continuous mining machines have been a reality in the soft coal industry for two or three years. Joy Mfg Co. has many of its mechanical miners in operation throughout coal fields. BCR has come up with an "extensible shaker-conveyor." That device will permit the mining machine to advance up to 300 feet without interrupting the operation.

The work of BCR is supported by many coal producing companies, coal-land companies and railroads. The objective is to raise per-man production of coal and shave mining costs.

Diesel Competition—Another coal research program that holds high hopes for the industry—the development of a coal-fired gas turbine railroad locomotive—also is reported on optimistically by BCR. A turbine built by Allis-Chalmers Mfg. Co. is being tested at the American Locomotive Co. plant at Dunkirk, N. Y. BCR hopes to see the coal-burning gas turbine become a competitor of the diesel locomotive.

Next year BCR will give major attention to the technical and economic aspects of block heating in business districts and will appraise the feasibility of increasing the use of electric furnaces in steelmaking. The agency is engaged with others in a project to develop an improved device to produce gas from coal.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Only military contractors get steel procurement aid from National Production Authority. Non-priority consumers are on their own, but may obtain more steel than they expect

"STEEL, steel, who's got the steel?" is the burning question among consumers, trade association executives, and others who are flocking to the third and fifth floors of the Commerce building where the new National Production Authority is grinding into gear. Here is substantially what they learn:

1. Assistance already is being given on an impressive scale to consumers needing steel for military purposes. The Munitions Board certifies the need, then the NPA asks one or more mills to schedule the tonnage. While this arrangement is on a voluntary co-operation basis—pending issuance of a general priorities order—it has 100 per cent compliance from the steel industry.

2. To non-priority steel consumers NPA is giving no assistance whatever. These consumers must depend on their dickers with sources of supply. This doesn't mean that NPA proposes to do nothing about civilian needs; it has this angle under close study. But it sees no immediate need for action of this kind. When the steel supply becomes more acute the remedy will be sought through limitation orders reducing output of automobiles and other products, thus making more steel available for other consumers.

You May Get More

NPA believes many consumers will be pleasantly surprised by getting more steel in fourth quarter than mills have agreed to ship them. Many mills, to prepare themselves to fill large military orders, advised their customers generally that fourth quarter shipments would be cut—particularly in sheets. Now it turns out that military steel requirements for fourth quarter will not exceed 700,000 tons. Hence the belief that producers will ship more tonnage to civilian consumers than promised. Here's an example of what can be expected. A consumer normally receiving 300 tons of sheets a quarter, and cut to around 175 tons for fourth quarter, actually may receive as much as 200 or 225 tons.

Inventory Control Revised

The inventory control order issued by NPA Sept. 18 met with sour comments from the industry and will be revised. Permissible inventory will be defined by the number of days' requirements that may be permitted in stock.

NPA officials are thinking about a 60-day limit on rolled steel products and a 30-day limit on pig iron. Iron and steel scrap will be eliminated from the inventory control order, so as to encourage collection, preparation and storage of scrap in chargeable forms.

War Demands Going Up

What about the future free supply of steel? NPA officials still do not have any definite indications that military steel requirements in the year starting Nov. 1 will exceed 4.1 million tons.

But they expect military requirements to grow. They reason that an increase in military appropriations from $14 billion last year to $30 billion this year, an increase in the number of armed men to 3 million, and the shift from a cold war to a shooting war, must cause military steel requirements to be much greater than now indicated. And with Washington expecting military appropriations of at least $40 billion next year, no reason is seen for expecting any easement in steel supply in the immediate future.

NEA

SURPRISE! There was no more surprised man in Washington than Roscoe Seybold when he was named acting chairman of the Munitions Board—with complete authority over that vital organization. Just retired from Westinghouse Electric Corp. as vice president in charge of finance, Mr. Seybold was brought into the board as vice chairman on Sept. 18, the same day that Hubert E. Howard, resenting the firing of his friend Louis Johnson as defense secretary, quit the Munitions Board

Whom To See

The men in NPA who have special familiarity with the problems of the industries in the metals field are: Frank T. McCue, chief, Iron and Steel Division; William L. Beck, chief, Machinery and Transportation Division, assisted by Willard Myer, Dewey M. Crim, and George R. Davis; Frank H. Hayes, chief, Nonferrous Metals Division, and John Haynes, chief, Construction Division.

All of these NPA staff men are to be found on the third floor of the Commerce building, or in Temporary T building, diagonally across Constitution avenue.

Civilians Need Not Apply

Contrary to widespread impressions, NPA does not have any immediate plan to serve as a claimant agency for civilian industry. Many industry associations have contacted commodity and industry division men in the Office of Industry and Commerce (now enrolled in the NPA) to state their claims for steel tonnage consideration. The association executives have not received any encouragement in this respect, but they have received good suggestions as to how, by preparing statistics and other information about their industries, they will be in a better position to demand consideration if the steel supply becomes really tight at some later date.

Interior Gets a Hand In, Too

Not all allocations planning activity under the Defense Production Act is going on at the National Production Authority in the Commerce Department. Over in Interior, officials are working on proposals for the electric power industry. Consultants to help determine materials and machinery requirements are C. B. McManus, president of Georgia Power Co., and Richard K. Lane, president of Public Service Co. of Oklahoma.

European Steel Shortage More Severe

Even if the ceiling is lifted in West Germany, the scarcity will remain because the Ruhr as yet can't produce much above the old limit of 11.1 million tons yearly

AMERICAN steel buyers are having more and more trouble placing orders with European producers. All but the French are booked nearly to capacity on most products. Even the French are sold out on sheets.

The easing of steel controls by the Allies in Western Germany won't spur exports much for some time because the Ruhr as yet isn't in any shape to produce much above the former limit of 11.1 million tons a year. The British steel industry is still producing at full tilt, nationalization or no nationalization, but it has been operating at or near capacity since the end of World War II and had less idle facilities to devote to production for the U. S. than any other country in Western Europe. Because of the reviving steel business in Belgium, unemployment has dropped from 216,000 at the beginning of the year to about 147,000 now.

Steel deliveries from Europe to the U. S. are becoming more extended; as many as seven months are required to get shipment on some products. Export prices are rising, too. The Germans, for example, are now quoting steel bars at $85 to $86 per metric ton.

Ruhr Tops Limit by 1 Per Cent

West Germany's steel ingot production for the year ended Sept. 30 exceeded the 11.1 million-ton limit by about 100,000 tons, but the excess production has been approved by the Allies.

The Allied foreign ministers have promised to lift West Germany's steel production ceiling. The maximum output possible now under optimum conditions in West Germany would not be more than 13 or 13.5 million tons. The Allies may eventually set the limits at about 12.5 million tons. Under average conditions, that's about all German steel men can produce. The capacity can be boosted above 13.5 million tons only after heavy capital expenditures.

Unemployment in West Germany is still severe, but it has been lessened by the steel boom. There's an actual labor shortage in the Ruhr. Most of the expellees from Eastern Germany are living in the northern agricultural areas of the western republic.

The German iron ore mining industry will be reorganized within the framework of the general reorganization of the steel industry, as carried out by the Allies. Four large mining companies probably will be formed. Each of the four companies will be connected with some of the new steel companies which are to arise from the whole reorganizational work. That job, incidentally, is proceeding at a snail's pace.

West Germany mined iron ore with an iron content of 1.8 million tons in the first seven months of 1950, compared with 1.2 million tons in the same 1949 period.

HOOKED BY COLONEL HARDIE
...55 per cent of Britain's steel industry

No Immediate U.K. Election Seen

Only a dissolution of parliament and new elections giving the majority to the Conservatives and Liberals can save the United Kingdom steel industry from public ownership. The chances for a general election in Britain before February are slim.

Under the nationalization act, all companies will be taken over that mine iron ore, smelt ore into pig iron in blast furnaces, convert pig iron and scrap into steel ingots and shape steel by hot-rolling.

Companies producing not more than 50,000 tons of ore per year or 20,000 tons of other products will not be nationalized but they will need licenses to continue. Those producing less than 5000 tons per year may continue without licenses. Firms producing castings, forgings, or engaged in fabricating, or building locomotives, ships, automobiles or other finished products will not be taken over, provided they do not produce more than 20,000 tons of steel per year. Large firms that are primarily engaged in fabricating finished products but who produced more than 20,000 tons of steel per year for their own use will be taken over lock, stock and barrel. The auto industry is the lone exception to that provision.

The approximate proportions of basic processes to be acquired or licensed by the state are (first figure refers to the percentage acquired, the second to the portion licensed, the third to the part unaffected): Iron ore 97.5, 2.5, 0; pig iron 97.6, 2.2, 0.2; carbon steel ingots 99.6, 0.3, 0.1; alloy steel ingots 93.7, 4.3, 2.0; rerolling 93.1, 5.2, 1.7; sheets 94.1, 4.6, 1.3; plates 88.0, 11.3, 0.7.

The approximate proportions of the fabricating industry to be acquired because the parent company is to be nationalized are (first figure refers to the percentage acquired, the second to the portion unaffected): Heavy forgings 45.5, 54.5; drop forgings 15.8, 84.2; steel castings 23.0, 77.0; wheels and axles 94.3, 5.7; wrought iron and steel tubes, pipes and fittings 67.2, 32.8; steel wire 60.0, 40.0; cold-rolled strip 72.4, 27.6; bright steel bars 40.7, 59.3.

On the basis of gross value of output, basing values on the average annual output in 1946 and 1947, about 55 per cent of the iron and steel industry is liable to state ownership. The nationalized companies will be run by the new Iron & Steel Corp., chairmanned by Lt. Col. Steven Lindsay Hardie.

French Seek Industrial Cost Cut

France is paring more than $200 million from the expenses in its deficit-laden nationalized industries for the rest of 1950 and all of 1951. About 23,000 jobs will be discontinued and departmental services will be curtailed. The nationalized railroads hope to save money by increasing electrification.

Belgium Rides Revival in Steel

Belgian steel export deliveries are more extended. Early last summer an American buyer of Belgian steel could get it in about one month. It now takes three to five months.

The steel revival is filtering down to domestic steel consumers, too. Railroad equipment makers are particularly active. Belgium is making 1500 freight cars for Spain. The foundry industry is reviving, chiefly because of defense orders.

More Room for Speed Nuts

Tinnerman's new plant isn't big enough, so the firm will use the old plant, too

WHEN CLEVELAND'S Tinnerman Products Inc. decided to build a new plant, the Tinnermans, father and son, thought they might as well build it big enough for the increasing expansion of their fast-growing business. They decided to build a plant that would provide 50 per cent more capacity than their old plant. But that wasn't enough. The new plant isn't big enough to take care of all the business coming Tinnerman's way.

Growing in Brooklyn—The $2-million plant opened last month in Brooklyn, a Cleveland suburb, is going at full tilt already. Pointing out that the company had expected to dispose of its old building in Cleveland, George A. Tinnerman, vice president and general manager, says an unwavering sales curve since 1930 and the current alltime high operations of the firm have made it necessary to order a lot of new equipment for the old plant. It won't be long before it, too, is humming again.

Branching Out—In 1913 company President A. H. Tinnerman organized Tinnerman Stove & Range Co., a successor to his father's retail hardware business in Cleveland. Grandfather G. A. Tinnerman developed the first steel range sometime in 1875. Wider use of natural gas for cooking opened the market for A.H. But when threaded nuts and lock washers were used to produce an enameled range with concealed fasteners, checks and cracks developed in the enameled surfaces from the jolts and twists during transportation. A. H. sought a solution to the problem and found one when he developed the Speed Nut in 1923. The product later literally revolutionized the fastener industry.

Overshadowing the Stove — The Speed Nut consisted of an arched strip of clock-spring steel with two arched prongs formed to engage the screw threads. It held stove panels firmly in place by spring tension and its resiliency absorbed the strains of moving and heat expansion, leaving enameled surfaces undamaged. The product was soon being used on all Tinnerman ranges and the company started to sell Speed Nuts to other stove manufacturers. In the early 1930s George A. joined the firm and by 1940 development of new designs and new applications based on the original fastening principle was so widespread that Speed Nut manufacture completely overshadowed the stove manufacturing business. The company converted completely to fastener manufacture, changed its name to Tinnerman Products Inc. in 1940.

Today the types of Speed Nut fasteners number more than 5000; additional designs are being developed at the rate of four to five a day as more and more manufacturers make wider use of Speed Nuts.

Cummins Expanding Its Biggest

The largest single expansion at one time in its 30-year history is going on at Cummins Engine Co. Inc., Columbus, Ind. Construction of a new building, 200 x 460 feet, has started. It will make available 2.1 acres of land under one roof and will add 92,000 square feet of floor space to factory facilities.

Known as the Stores Center building, it will become a central storage spot for all materials and supplies. It will also house quality control and inspection activities and an enlarged department for shipping service parts. Irwin Miller, Cummins president, says that by the time the building is completed, Cummins will have spent over $5 million since warend for modernization and addition space. Production capacity increased 60 per cent in five years (see also STEEL, Sept. 4, p. 75). The company currently employs 2300 people. Cummins, a pioneer of lightweight, high-speed diesels, has 84 models in the 50-550-horsepower range. They are used in earth-moving and mining equipment, work boats and pleasure craft, on-highway and off-highway trucks and a variety of other heavy-duty applications.

Caterpillar Tries a Deep Freeze

Caterpillar Tractor Co. has started operation of new facilities at San Leandro, Calif., to test its products under sub-zero conditions.

In two special rooms added to the firm's research department equipment can be tested at temperatures ranging down to 65 degrees below zero. The rooms are inclosed in 15-inch-thick insulated walls and refrigerants are piped through 6 miles of tubing in the ceilings and floors. A two-way sound system has been installed so that observers conducting tests can communicate with technicians in outside rooms.

Nevada Laws May Aid Industry

Metalworking may reap benefits from the free and easy laws of Nevada.

The recently formed Vaughn Nevada Warehouses secured 52 acres of land in Sparks, Nev., as a warehousing, assembly and factory project. Vaughn Nevada will take advantage of the Free Port Law that exempts all state taxes on warehousing, all state taxes on assembly of merchandise destined for any part of the country and the personal property state tax on holdings. The company, headed by Ralph A. Vaughn, 672 S. Lafayette Park Place, Los Angeles, will build facilities to order for manufacturers, processors and distributors.

Rubber Plants Reactivated

Southern California's synthetic rubber plants, idle since the end of World War II, were alerted to pre-

ONLY A PART: Many types of Speed Nut fasteners are produced on these Four-Slide presses in this section of the new plant of Tinnerman Products Inc., Cleveland. Shortly the company will construct a new research laboratory adjacent to the office section of its $2-million plant

pare for immediate operation to forestall a possible rubber shortage.

Standard Oil Co. of California will operate the El Segundo plant, Shell Oil Co. will run a Torrance plant, and the Minnesota Mining & Mfg. Co., will team with the Pacific Rubber Co. to run a second Torrance plant.

Standard's El Segundo butadiene plant will be in operation in 60 to 90 days. Shell operations will be underway at a butadiene plant in Torrance this month. Minnesota Mining & Mfg. Co. and Pacific Rubber Co. is to have a copolymer plant operating shortly in Torrance.

GE Buys Turbodyne

General Electric Co. bought the patents, name and technical data of Turbodyne Corp., Hawthorne, Cal. Turbodyne, a Northrup Aircraft Inc. research subsidiary, developed a turboprop aircraft engine believed to be one of the most powerful propeller-type aircraft power plants in the world.

C. W. LaPierre, manager of the Aircraft Gas Turbine Divisions of GE's Apparatus Department, says future work on turboprops will include test and evaluation of several engines that were built by Turbodyne under U.S. Air Force and Navy sponsorship.

UP Planning Industrial District

Union Pacific Railroad is planning an enlarged industrial district at Sidney, Neb. The railroad recently built an industry spur track to an 11-acre tract east of the city, where five firms began preliminary steps for location.

Firms that will locate in the district include Western Implement Co., International Harvester Co., National Supply Co., Continental Supply Co. and Black, Sivalls & Bryson Supply Co.

Located about 400 miles west of Omaha on UP's main line, Sidney is figuring more prominently in the agricultural economy of western Nebraska and in recent oil development in its vicinity. In the past decade, the city's population increased from 3388 to almost 5000.

Ekco Expansion Half Finished

A $425,000 improvement program aimed at expanding production facilities at Ekco Products Co., Chicago, is now more than half complete.

David Canmann, vice president, says the work on the plant and equipment should be finished in 60 days. The most needed feature of the program is 40,000 square feet of floor space that is being added to the main plant. Other work in the huge housewares firm's program is expansion of production capacities in the bakery division and improvements in plant facilities.

NEA

"JOT DOWN" TIME: R. W. Early, an engineer at Westinghouse's East Springfield, Mass., works, presets a new robot temperature recorder for a series of temperature tests. The device makes use of an IBM electric typewriter to record as many as 1320 temperature readings a minute in various parts of a household refrigerator. Developed by Fred A. Harshberger of the Westinghouse appliance division engineering division, the device was described at a joint meeting of the American Institute of Electrical Engineers and the Instrument Society

LaPointe British Plant Opened

A new and greatly enlarged plant of LaPointe Machine Tool Co. Ltd., British affiliate of LaPointe Machine Tool Co., Hudson, Mass., was opened at Bushey, Hertfordshire, England. It replaces a plant at nearby Edgware and is to be devoted exclusively to the manufacture of broaching machines and broaches.

The new building has 40,000 square feet of production area. Its heat-treating department has gas-fired vertical furnaces, the largest of their kind in Europe. John J. Prindiville Jr., president of LaPointe, says the new plant was required because of a great expansion in the demand for broaching equipment from British and European markets since the associate company was organized in June, 1920.

American Can Stretches Out

Meat and vegetable packers in the Twin City area will get enough cans to pack all the meat and vegetables they want when American Can Co. expands its can-manufacturing facilities at its St. Paul plant.

American Can will build a one-story structural steel and brick building with about 75,000 square feet of floor space adjacent to its existing plant. The building will house new can-making lines, each of which is capable of producing up to 400 containers a minute, drying oven equipment, storage facilities and truck and car loading spots. The new project will cost about $1 million. The St. Paul plant employs 325 men and women, the expansion will create about 75 additional jobs. The addition with all its equipment should be ready for operation in the summer of next year.

Monorail Cost: $834,000 a Mile

Streamlined, rocket-like monorail overhead transit cars will bring San Fernando valley points within minutes of Los Angeles if plans of the newly-formed Southern California Monorail & Transit System Inc. of Los Angeles go through. The overhead rail from which cars would be suspended is estimated to cost $834,000 per mile to construct. The system will span 20 or more miles and connect with bus feeder lines. It would be the first such system in the United States. Germany had monorails operating fifty years ago.

Refrigerator Cars Ordered

Pacific Fruit Express Co., jointly owned by the Southern Pacific and Union Pacific railroads, will build 2100 additional refrigerator cars to bring its fleet of "reefers" to 40,100, the world's largest supply of this type of rail carrier. The new additions will also raise the amount spent on expanding, modernizing and repairing its fleet since the end of the war to $125 million.

Of the new additions, 100 cars will be heavily-insulated 50-foot cars for transporting frozen foods. PFE already has 414 cars of this type in operation. The otner 2000 cars will incorporate the latest developments in refrigerator cars including steel-slatted, instead of wooden, floors. The new units will be built in the company's manufacturing plants at Los Angeles and Colton, Calif. The first of the new cars will go into service about the middle of next year.

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GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

The De Soto Division of Chrysler has really done a job in plant layout on the structure on Warren avenue that was once occupied by Graham-Paige

DETROIT

COMPLETION of De Soto's Warren avenue body and engine-building plant in Dearborn sharply boosts the capacity of that Chrysler division. It provides facilities for early manufacture of a completely new power plant. The structure, at one time occupied by Graham-Paige, is located on a 41-acre tract and was almost completely rebuilt to provide 1.1 million square feet of floor space, about two-thirds of which is devoted to body manufacture. Operations are manned by 5000, equally divided between body and engine building.

Conveyors Electronically Controlled—Every process used in body construction was given the closest scrutiny by plant layout engineers. They came up with scores of improvements, including many devices to eliminate the manual handling of bodies and materials. Nearly 8 miles of conveyors wind throughout the plant. All are electronically controlled and comprise what is claimed to be the largest installation of its kind ever put together.

The De Soto body is an all-steel welded unit and in the new plant's welding department are 540 separate welding machines and guns, each designed for a specific job. The multiple spot welder produces 198 welds in 17 seconds at the push of a button.

Plant Within a Plant—The paint department, a plant within a plant, is walled off from the welding and trim departments.

Fully air conditioned, it gets a clean air supply at a rate of 1,640,000 cubic feet per minute. Air is heated, washed through water, reheated, passed through four successive layers of oil and dry filter curtains and fed through ducts to the paint department where it is filtered once again before being diffused throughout the area. An additional 1,208,000 cubic feet per minute of fresh air is supplied other departments.

Loading platforms along the material receiving docks are electrically operated and can be raised or lowered so they are always flush with the beds of delivery trucks. Fork lift trucks move incoming material to conveyor lines. The latter dip down at the loading point, carry material throughout the plant high in the air, then descend again where the parts are unloaded. Bodies on the conveyor system are carried either through the air or along the floor, whichever best suits the particular operation. Synchronization of upper and lower conveyors permits transfers without human effort. A special conveyor attachment permits the body to rotate in a circle so that all sections can be reached easily.

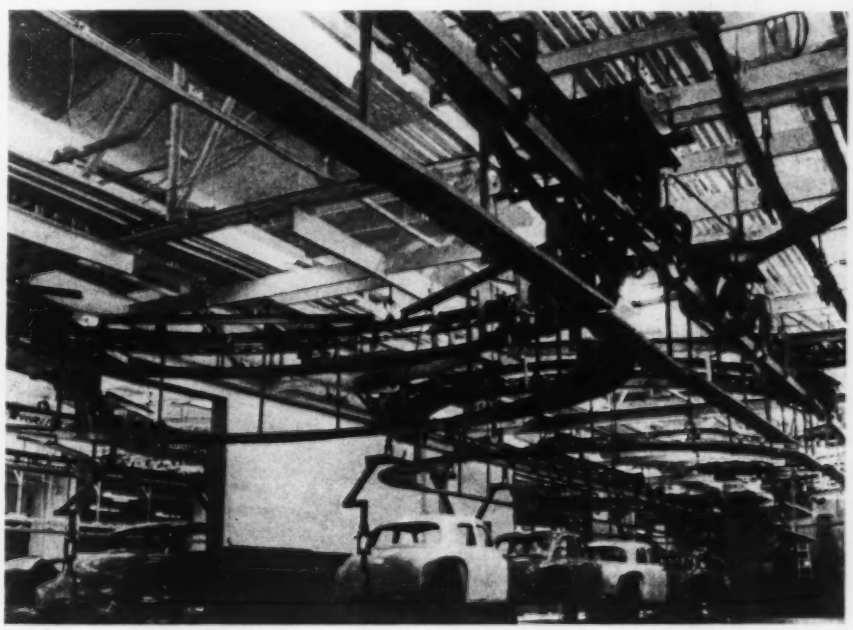
With the exception of one portion of the trim department, the entire operation is on one floor, the only second-floor activity being the sewing room where upholstery sections are stitched together. The plant is painted in light and cheerful shades of yellow and green. Natural sunlight from skylights is supplemented by fluorescent lighting. Production capacity is 60 bodies per hour and operations are on two shifts. The building adjoins the main De Soto assembly and press plants, and completed bodies are trucked there to be placed on chassis. Other bodies move by rail to West Coast assembly points.

More Higher Car Prices Coming

More higher prices are being announced by car builders: Following raises of $80 to $112 on the Packard 200 series, its highest volume model, Kaiser-Frazer marked up prices from $10 to $120 and Nash boosted its Rambler models $29, Statesman models $77 and Ambassador series $98. Price details on Hudson, Studebaker and Mercury are scheduled for October and in view of actions by other manufacturers it seems almost a certainty these three will do likewise. Nash pointed out that its higher price tags still do not fully cover increases in costs to date, although it is hoped sustained volume of production may ease the problem of getting into the black ink. Sales of 1950 models, incidentally, soared about 41 per cent above the previous year.

Hudson May Reopen Rolling Mill

Hudson is "giving some consideration" to reopening of its steel sheet rolling facilities at New Castle, Pa. That is as far as A. E. Barit, president, would go in commenting on re-



GRAND CENTRAL STATION: That's what the boys on the line at the new De Soto body-building plant on Warren avenue in Detroit call this spot in the intricate 8-mile conveyor network that moves bodies through fabricating and finishing operations covering a single-floor area of about 725,000 square feet. Capacity of the system is 60 bodies an hour

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ports out of Pittsburgh to the effect the project was under way. While some of the equipment in the leased plant has been sold, major elements of the mill line are still owned by Hudson.

Output Passes 1949 Total

Passenger car production last week lapped the total for all of 1949—approximately 5,126,000—and is now headed down the last quarter stretch toward a probable 6,600,000 for the current year. That means output of 1,475,000 in the next three months, breaking down to an estimated 600,000 in October, 500,000 in November and the balance in December. This rate is 15 per cent under the pace maintained in the third quarter and is believed to be within the limits of material supply.

Preliminary tally on September output of cars and trucks indicates a total of something under 750,000, almost the same as the July record, but 100,000 under the August volume. Truck production now is running 15 per cent of the total and demand is holding surprisingly well. A strong surge of buying developed after the outbreak of hostilities in Korea, and this has now subsided. On top of this, the imposition of credit curbs has tended to soften the market, particularly for used cars. Some used car lots had been selling on the basis of practically no cash down payment, and are finding fewer buyers with the required one-third deposit. Whether the situation is temporary or not, no one can say for sure. However, there is increasing pessimism among the nation's used car dealers, and prices are tumbling.

Market Begins To Soften

The season is approaching when new car sales normally taper. This year will be no exception, from present signs, although manufacturers are not slicing their schedules too seriously. Model changeovers in November and December obviously will take some toll in assemblies, yet there is no easing of the pressure on suppliers of parts and materials. Floats are at a practical minimum, with any interruptions to shipments being reflected almost immediately on the assembly line. Strike-caused shortages of paint, door panels, window regulators, mouldings and body trim have forced short-lived suspensions at half a dozen passenger car builders, with follow-up men frantically trying to plug the holes by calling on alternate sources.

Inventory shutdowns at Buick-Olds-Pontiac assembly plants throughout the country have resulted in some slackening of General Motors' output. Six of these plants will stagger one-week closings through November. Buick will be started on its 1951 models by mid-October, but will defer its official press preview until Dec. 14. Olds and Pontiac likely will follow a similar pattern.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
May	721,161	508,101
June	897,864	523,689
Six Months	3,941,883	3,034,055
July	746,771	604,351
August	840,000*	678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
Sept. 9	151,606	123,806
Sept. 16	185,421	159,493
Sept. 23	186,756	158,518
Sept. 30	188,000	151,593

Estimates by Ward's Automotive Reports

* Preliminary.

Ford Reorganizes Manufacturing

Ford has reorganized its general manufacturing division into six new and separate units, following announcement of the creation of an Aircraft Engine Division at Chicago. The other five are: Automatic Transmission Division at Cincinnati, Canton Forge Division at Canton, O., and the Highland Park Division, Mound Road Division, and Tractor & Industrial Engine Division in the Detroit area. All will be under the supervision of John Dykstra who joined Ford in 1947 as general production assistant to Del S. Harder, vice president-manufacturing. Dykstra now becomes vice president-manufacturing group. Concurrently, Walker A. Williams, Ford division sales manager, has been named vice president-sales and advertising to fill the vacancy made by resignation of J. R. Davis.

Willys Engine in the Henry J

Detailed specifications on optional four or six-cylinder engines built by Willys-Overland for Kaiser-Frazer's new Henry J model show ratings of 68 hp at 4000 rpm for the four and 80 hp at 3800 rpm for the six. Both have compression ratio of 7:1, with piston displacement of 143.2 and 161 cubic inches respectively. Pistons are aluminum alloy with three rings. Air cleaner is the dry type oil coated.

The car itself is on 100-inch wheelbase, weighing 2341 pounds in the six-cylinder version. Overall length is 174½ inches, maximum width 70 inches, height 59⅝ inches, road clearance 7¾ inches, front and rear treat 54 inches, turning radius 17½ feet, seat widths 54¾ inches front and 56¾ inches rear. Front springs are the independent coil type, rear five-leaf semi-elliptic.

WILL IT CLICK? The 2300-pound Henry J, with 100-inch wheelbase, 54-inch tread and powered by either a 4 or 6-cylinder L-head engine (68 and 80 horsepower at 4000 and 3800 revolutions per minute, respectively), is now in volume production at Kaiser-Frazer plants. Thus the issue is joined to determine if car buyers want a low-priced, light-weight vehicle that isn't too far below standard dimensions and power

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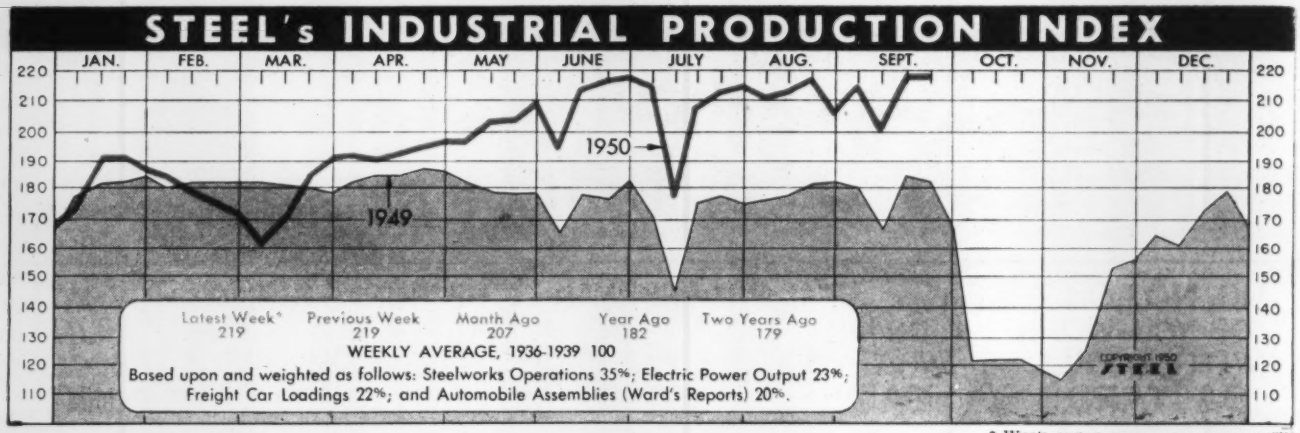
STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
220 210 200 190 180 170 160 150 140 130 120 110
1950
1949
Latest Week* 219
Previous Week 219
Month Ago 207
Year Ago 182
Two Years Ago 179
WEEKLY AVERAGE, 1936-1939 100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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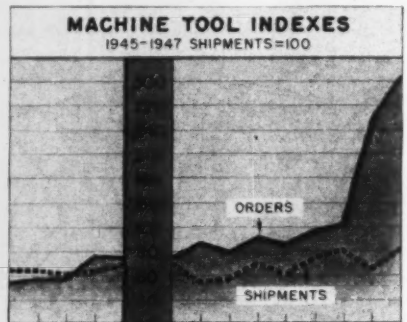
* Week ended Sept. 23 (preliminary)

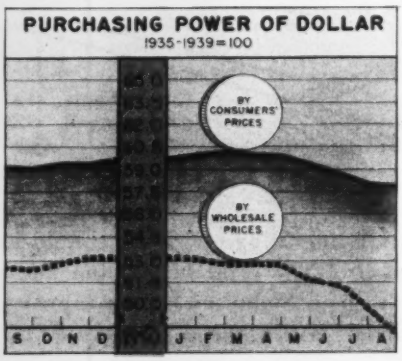


Charts—Copyright 1950, STEEL

Machine Tool Indexes

	New Orders		Shipments	
	1950	1949	1950	1949
Jan.	99.7	87.0	52.4	68.8
Feb.	89.2	80.9	56.1	70.3
Mar.	107.4	93.5	75.3	75.8
Apr.	98.9	70.1	61.6	74.7
May	116.4	63.7	82.5	72.8
June	126.2	53.6	91.9	79.0
July	253.1	48.0	68.3	60.7
Aug.	307.3	51.5	93.7	67.3
Sept.	....	57.7	...	67.6
Oct.	....	56.8	...	62.3
Nov.	....	84.3	...	67.6
Dec.	....	82.5	...	75.7

National Machine Tool Builders' Assoc.

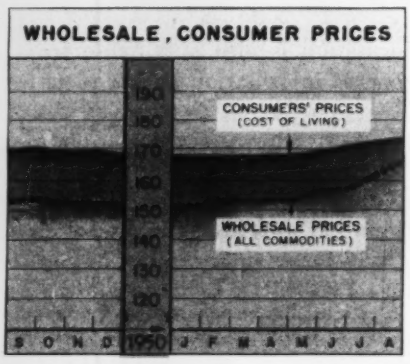


Purchasing Power of the Dollar

As Measured by:

	Wholesale Prices		Consumers' Prices	
	1950	1949	1950	1949
Jan.	53.1	50.1	59.9	58.5
Feb.	52.7	50.9	60.1	59.2
Mar.	52.7	50.8	59.9	59.0
Apr.	52.6	51.2	59.8	58.9
May	51.6	51.6	59.3	59.1
June	51.2	52.0	58.8	59.0
July	49.5	52.4	58.0	59.3
Aug.	48.0	52.6	57.8	59.2
Sept.	...	52.4	...	59.0
Oct.	...	52.8	...	59.3
Nov.	...	53.2	...	59.3
Dec.	...	53.2	...	59.7

U. S. Office of Business Economics



Price Indexes

	Wholesale		Consumers	
	1950	1949	1950	1949
Jan.	151.6	160.5	166.9	170.9
Feb.	152.7	158.1	166.5	169.0
Mar.	152.6	158.4	167.0	169.5
Apr.	152.9	156.9	167.3	169.7
May	155.9	155.7	168.6	169.2
June	157.3	154.4	170.2	169.6
July	162.9	153.4	172.5	168.5
Aug.	166.3	153.0	173.0	168.8
Sept.	....	153.6	....	169.6
Oct.	....	152.2	....	168.5
Nov.	....	151.6	....	168.6
Dec.	....	151.3	....	167.5
Average	....	154.9	....	169.1

Bureau of Labor Statistics

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction Sept.25	Furnaces, W. Air..Sept.18	Refrigerators Sept.25
Durable Goods Sept.25	Gear Sales Sept.11	Steel Castings Aug.21
Employ., Metalwkg.Sept.18	Gray Iron Sept.4	Steel Forgings Aug.7
Employ., Steel.....Sept.18	Indus. Prod. Sept.11	Steel Shipments ..Sept.25
Fab. Struc. Steel...Sept.4	Ironers Sept.25	Trucks, Elec. Ind...Jan.2
Foundry Equip. ...Sept.11	Pump Orders Sept.11	Wages, Metalwkg. .Sept.18
Freight Cars Sept.18	Radio, TV Aug.14	Washers Sept.11
Furnaces, Indus. ..Sept.18	Ranges, Elec. Sept.25	Water Heaters Sept.11

Tool Orders Still Zooming

Machine tools had another big month in August as metalworking companies pushed to get their productive machinery in top shape before a possible government priority system gets going. The National Machine Tool Builders' Association's new orders index jumped to 307.3 in August from 253.1 in July. One year ago it was only 51.5.

Shipments also surged though not as rapidly as orders. The association's shipments index reached 93.7 in August, compared with 68.3 in July and 67.6 in August, 1949. Foreign orders, included in the new orders index, showed a gain to 34.1 in August from 22.3 in July and 18.8 in August last year.

Price Indexes Climbing

Further advances in the wholesale and consumers' price indexes published by the Bureau of Labor Statistics pushed the purchasing power of the dollar, as measured by these indexes, further downward. The consumers' price index rose 0.3 per cent between July 15 and Aug. 15 to 173 per cent of the 1935-1939 average and the wholesale index for August reached 166.3 per cent of the 1926 average.

All major items, except food, contributed to the rise in the consumers' price index in the period ended Aug. 15. Chiefly responsible for the advance were a 1.6 per cent rise in housefurnishings costs, a 1.2 per cent increase in the cost of miscellaneous goods and services and a 1.0 per cent gain in fuel, electricity and refrigeration. The food price index dropped 0.5 per cent in the latest month reported, the first decline since February.

All major groups that make up the wholesale price index advanced in August. The only ones which advanced less than 1 per cent were farm products and fuel and lighting materials.

The Business Trend

Civilian goods output continues at high levels despite increasing shortages of materials. Many companies increase work forces, lengthen work weeks

HIGH production despite shortages describes metalworking activity in the month just ended. The output marks chalked up during the month are a tribute to the managements of countless companies who found ways of beating the game.

Just how long civilian goods can keep flowing in large volume without stoppages caused by the lack of critical materials is getting to be an important question. A few companies have found it necessary to cut output for lack of raw materials but a far greater number have increased work forces and lengthened hours worked per week in order to satisfy high demand. Some of the latter group undoubtedly are eating into inventories to the danger point. They are gambling that they will be able to get additional material at a later date.

Output remains at record or near record highs. In the week ended Sept. 23 STEEL's industrial production index remained at a preliminary 219 per cent of the 1936-1939 average, tying the alltime high for the second consecutive week. All four components of the index—carloadings, the steelmaking rate, electric power generation and automotive assemblies—are at high levels.

Steel Above Capacity . . .

Last week steelmaking furnaces operated slightly in excess of theoretical capacity for the third consecutive week. In the week ended Sept. 23 the rate was 101 per cent, unchanged from the preceding week. Despite straining its tremendous capacity to the limit and continuing a giant expansion program, the steel industry finds consumers yelling for still more steel. Labor troubles are being experienced at a few plants as steel workers express their dissatisfaction with present wages. These wildcat stoppages haven't seriously hindered production as yet but will probably become more widespread as time for negotiating a new contract draws near.

New Auto Records . . .

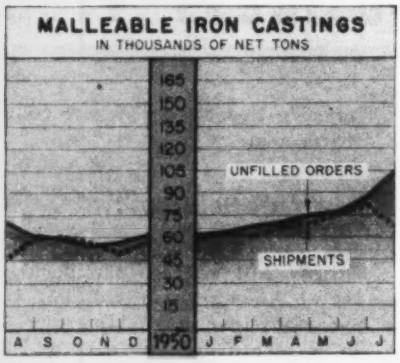
A variety of automotive industry records will go into the books this year. Among these will be: U. S. passenger car assemblies per day, week, month and full year and total annual outturn of both passenger cars and trucks in U. S. and Canadian plants. Additional records are bound to be included in the overall totals, the exact number set will depend on how much time a tabulator wants to spend in checking against previous bests. In the first three quarters U. S. plants assembled about 5 million passenger cars and 1 million trucks. Another 1.6 million cars are expected to be added before yearend.

Longer Work Week . . .

Average work week for the 12.7 million production workers rose to 41.2 hours per week in mid-August, highest August level since 1944. Bureau of Labor Statistics says weekly earnings in manufacturing industries rose by $1 to an alltime

BAROMETERS of BUSINESS

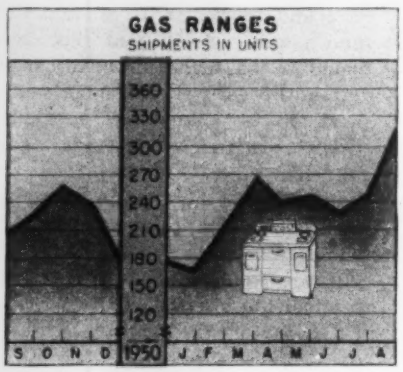
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	101.0	90.0	86.0
	Electric Power Distributed (million kilowatt hours)	6,457	6,449	6,346	5,556
	Bituminous Coal Production (daily av.—1000 tons)	1,885	1,670	1,873	1,449
	Petroleum Production (daily av.—1000 bbl)	5,894	5,938	5,699	4,933
	Construction Volume (ENR—Unit $1,000,000)	$238.9	$219.7	$198.8	$188.7
	Automobile and Truck Output (Ward's—number units)	187,556	185,421	179,042	158,007
	*Dates on request. † 1950 weekly capacity is 1,926,803 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (unit—1000 cars)	870†	866	837	661
	Business Failures (Dun & Bradstreet, number)	155	165	176	169
	Money in Circulation (in millions of dollars)‡	$27,081	$27,151	$29,963	$27,365
	Department Store Sales (changes from like wk. a yr. ago)‡	+17%	+8%	+12%	−7%
	† Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$18,497	$15,066	$15,404	$15,160
	Federal Gross Debt (billions)	$256.8	$258.1	$257.8	$256.4
	Bond Volume, NYSE (millions)	$20.4	$22.7	$15.6	$14.2
	Stocks Sales, NYSE (thousands of shares)	9,901	10,890	8,198	6,366
	Loans and Investments (billions)†	$68.9	$68.5	$68.1	$66.3
	United States Gov't. Obligations Held (millions)†	$34,840	$34,698	$35,078	$37,594
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.99	156.99	156.99	152.52
	STEEL's Nonferrous Metal Price Index‡	217.2	217.1	206.8	180.3
	All Commodities†	169.7	169.1	166.0	154.0
	Metals and Metal Products†	176.0	176.0	174.9	168.8
	† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100. †† 1935-1939=100.				



Malleable Iron Castings
Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1950	1949	1950	1949
Jan.	62.9	71.9	62	126
Feb.	60.4	66.7	67	118
Mar.	66.3	72.1	70	102
Apr.	69.8	61.3	76	95
May	76.2	54.6	77	79
June	82.3	59.6	87	70
July	67.5	44.4	105	71
Aug.	...	58.1	..	61
Sept.	...	60.5	..	58
Oct.	...	57.2	..	54
Nov.	...	49.4	..	56
Dec.	...	57.4	..	61
Total	...	713.1		

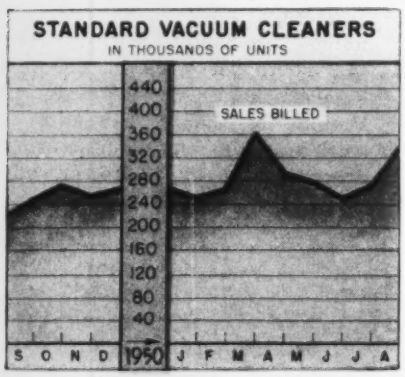
* For sale. Bureau of the Census



Gas Rangers
Shipments in Units

	1950	1949	1948
Jan.	165,000	106,700	222,800
Feb.	209,000	117,700	228,400
Mar.	264,000	151,500	252,100
Apr.	239,100	150,100	245,300
May	242,800	151,600	257,800
June	224,700	162,200	250,500
July	248,000	125,800	203,600
Aug.	318,000	206,100	250,100
Sept	.....	227,300	248,500
Oct.	.....	257,500	257,500
Nov.	.....	237,400	202,300
Dec.	.....	175,700	131,100

Gas Appliance Mfrs. Assoc.



Standard Vacuum Cleaners
Sales Billed—Units

	1950	1949	1948
Jan.	249,150	228,769	304,273
Feb.	263,515	241,267	311,448
Mar.	361,014	309,897	355,415
Apr.	292,664	252,656	306,588
May	278,645	222,850	276,657
June	250,190	207,354	256,071
July	279,967	161,920	229,537
Aug.	341,232	219,909	237,202
Sept.	.....	250,036	280,084
Oct.	.....	272,520	281,573
Nov.	.....	253,516	255,080
Dec.	.....	265,513	273,890
Total	.....	2,886,514	3,360,859

Vacuum Cleaner Manufacturers Assoc.

Charts—Copyright, 1950, STEEL.

record of $60.28 in mid-August. Average workweek for the durable goods division as a whole increased from 41.1 to 41.7 hours over the month to a new postwar high. Except for the transportation equipment and instruments and related products groups, higher averages of gross weekly earnings were reported by all industry groups in the hard goods division, a direct consequence of the extended work period. The two industries mentioned above maintained the high levels of immediately preceding months. Average weekly earnings in durable goods industries rose to $64.09, a new high.

Freight Car Repairs . . .

In addition to revitalizing their freight car buying programs the railroads are stepping up repairs on existing equipment. Association of American Railroads says the nation's railroads made a greater net reduction in unserviceable cars during August than in any other month since October, 1939. On Sept. 1 the railroads had 14,633 fewer freight cars undergoing or awaiting repairs than they had a month earlier. They had 108,346 unserviceable cars on Sept. 1, compared with 122,979 on Aug. 1.

Coal Mining Steady . . .

Bituminous coal mining operations were maintained at a steady pace in the week ended Sept. 16 as 11.3 million tons were produced. Cumulative output this year to the latest reported date is 342.2 million tons and tops the 340.5 million tons mined in the corresponding period a year ago.

PMI Studies Partial War

Stampers find some problems harder to solve now than with total mobilization

ALTHOUGH they admit a "percentage war" should not be used as an excuse to control everyone and everything, stampers admit current problems concerned with the proper distribution of raw materials, supplies and labor are far more difficult to solve than when the nation is under rigid controls.

Close co-operation between members, nonmembers in the stamping industry and the government were viewed as essential to the industry at the Pressed Metal Institute's annual meeting at the Hotel Tadoussac, Quebec. Orrin B. Werntz, managing director of the institute, says PMI's Washington office and the Industry Mobilization and Industry Advisory Committees will closely look after the interest of stampers and the nation.

More But Not Enough—A survey made by the institute discloses that members are getting 50 per cent more steel than they were in 1940 but some companies are paying juicy premiums to get necessary steel. About 30 per cent of reporting companies are getting 75 per cent of their steel from warehouses and 40 per cent report buying some premium steel this year. Premium purchases vary from 5 to 90 per cent of all steel bought by the companies.

Authority to offer its services to both the Steel Industry Advisory Committee and the National Production Authority with the aim of correcting the maldistribution is given to PMI by its board of directors.

Room To Grow — Nearly half the 200 companies replying to the industry mobilization questionnaire are operating two or three shifts. The rest say they could move into second shift production if necessary provided they can get additional skilled help. There's the rub—in tool and die maker and tool and die setter classification where training time is from two to four years there is already a severe pinch. Added space in existing buildings is available at 70 per cent of plants.

Howard C. Wolf, assistant to the president, Mullins Mfg. Co., Salem, O., is president of the Pressed Metal Institute for the coming year. Thomas L. Baker, vice president, National Stamping Co., Detroit, is vice president and Hunter Morrison Jr., is secretary-treasurer.

Bridgeport Having Big Year

Bridgeport Brass Co., Bridgeport, Conn., topped sales for all 1949 in the first eight months this year, says

Herman W. Steinkraus, president and chairman of the board. Profits are also at a new high rate. Greater operating efficiency at high levels made possible the increased earnings, Mr. Steinkraus explains. The company has had the benefit of new plants and equipment acquired since the end of the war at a cost close to $10 million. These plants were acquired at a fraction of today's cost.

Company's accounting system now reflects the use of Lifo or last-in-first-out method of inventory valuation which tends to reduce substantially the effect of fluctuations in raw materials prices from operating results.

Package Machinery Backlog Big

Largest order backlog since the end of World War II is reported by Package Machinery Co., East Longmeadow, Mass. Up to the outbreak of the Korean war business was reasonably good, states Roger Putnam, president, but since then orders spurted. He believes prospects are very good.

A strike put a hitch in production on new business. Some 600 production workers walked off the job, closing the factory.

Mr. Putnam, recently returned from a European visit, is optimistic about prospects for business in England. A working arrangement between Packaging Machinery and certain British companies is working out very well and the latter concerns are enjoying booming business. He believes his company will be working on government orders by the yearend.

Vacuum Cleaners Roll On

Vacuum cleaner sales turned sharply upward in August after four months of decline. Vacuum cleaner Manufacturers Association says the total for that month was 341,232 units, highest since March when an alltime monthly high for the industry was set.

C. G. Frantz, secretary-treasurer of the association and president of Apex Electrical Mfg. Co., Cleveland, says the total for this year is expected to approach the industry's alltime high of 3,800,687 units established in 1947. Sales in the first eight months totaled 2,316,377 cleaners, almost 27 per cent more than in the corresponding period a year ago. Before the war the industry's sales did not greatly exceed 1 million units yearly. Since the war the industry has produced 14,656,882 standard-size units.

Norge Expansion Pays Off

Norge Division, Borg-Warner Corp., Chicago, finds its $12 million postwar expansion paid off this summer in the form of increased production and record sales. George P. F. Smith, president of Norge Division, says August was the largest month sales-wise in the division's history. Its household appliances are now being shipped to distributors at the rate of about a million units per year. In September demand for its appliances continued to exceed supply. It is the company's belief current demand for household appliances represents a solid need, that scare buying had pretty well tapered off by the end of July.

Reports from dealers indicate there was an unusually heavy amount of cash buying even before consumer credit restrictions were imposed, Mr. Smith continues, substantial down payments were the rule rather than the exception.

Postwar addition of new plants and new and improved equipment places Norge in an extremely flexible position. "It is reasonable to assume we could handle our share of the manufacture of war products and at the same time produce a considerable volume of household appliances," Mr. Smith says.

Construction Machinery Shipments Biggest Yet

EXCAVATING and earthmoving equipment shipments, including off-highway trucks, should reach an alltime high this year. Since May of this year demand for bulldozers, power cranes and shovels, graders, rollers and other equipment types used in construction and roadbuilding has shown a marked improvement. Tractors and bulldozers are currently the hottest items with shovels next on the list. All other items are described by construction machinery sales firms as being at least warm.

Sales for all 1950 are estimated at $567.9 million, topping the previous high set in 1948 by more than $54 million. This year's estimated sales total represents a large improvement over 1949 figures. The accompanying chart shows a comparison between the estimated total for this year and the preceding three years. Shipments in the first half totaled $270.4 million, the Census Bureau reports.

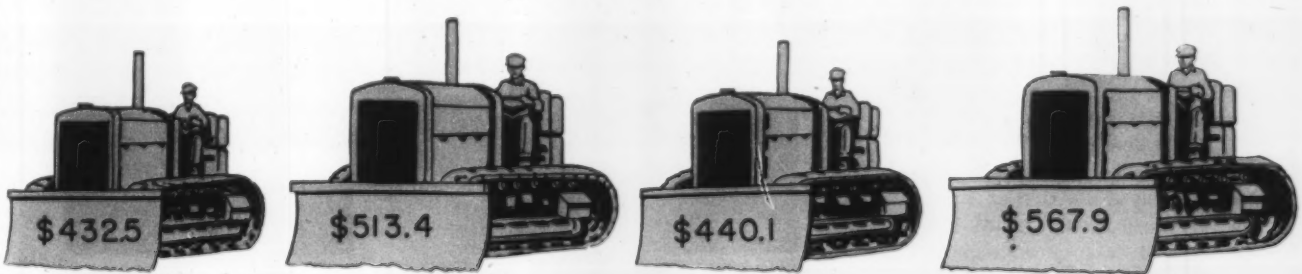
Bulldozers or Tanks—An expanding military program may bring some shifts in production for manufacturers of excavating and earthmoving equipment. Though this is a possibility for the future, military business will not be too big a factor this year.

Experience in World War II showed that the industry's products with slight modifications for military uses were needed for performing important tasks with the armed forces. Although the bulldozer won lasting fame during the conflict other machines also performed meritoriously in constructing roads, bases and air strips.

Confident—Construction machinery builders are banking on the industry's growth even in normal times. Capacity has grown since the end of the war and is still increasing. Latest large expansion is Caterpillar Tractor Co.'s $7 million factory in Joliet, Ill. Caterpillar expects to set a new high in sales this year without the need of a military buying prop.

Parts business is good. It is estimated as being about 75 per cent of the volume achieved in 1948 when many construction firms were trying to keep their old machinery going until new equipment became available.

Another spot of comfort to machinery makers and distributors is that there appears to be little duplication in orders. Customers are buying specific equipment items and not placing orders with several outlets and hoping at least one of them will come through as they did at the end of World War II.



* Estimated. U. S. Bureau of Census source for 1947-1949 figures. All figures in millions of dollars.

Men of Industry

ROBERT L. COE
. . Chase Brass & Copper board chairman

RICHARD C. DIEHL
. . . president, Chase Brass & Copper

Kennecott Copper Corp. announced that **Chase Brass & Copper Co. Inc.,** Waterbury, Conn., a subsidiary, elected **Robert L. Coe** chairman of the board, and **Richard C. Diehl,** president. In his new capacity Mr. Coe will continue as chief executive officer of the company. He began his career with Chase in 1917, later became vice president in charge of sales, and in 1950 was elected president. Mr. Diehl has been with Wheeling Steel Corp. for 15 years, serving successively as assistant chief metallurgist, chief metallurgist, assistant general manager, and most recently as general manager of its Steubenville, O., plants.

Sherman S. Cross was appointed operations manager, **Brainard Steel Co.,** Warren, O., succeeding **J. Howard Patton,** resigned. He joined Brainard in 1949 as chief product engineer. In 1945 he became assistant plant superintendent, Weatherhead Co., Cleveland, and resigned in March of 1949 to become vice president and part owner of Powermatic Inc., Akron.

Electrol Inc., Kingston, N. Y., appointed **Vincent A. D'Aprile** as sales engineer to handle its line of hydraulic devices in the industrial field. He was formerly associated with Douglas Aircraft Co. Inc.

Promotions in the manufacturing department, **Caterpillar Tractor Co.,** Peoria, Ill., include: **J. R. Munro,** general factory manager, appointed to the newly created position of director of manufacturing; **C. A. Woodley,** named general factory manager; **W. L. Naumann** and **Lloyd J. Ely,** appointed assistant general factory managers. Mr. Naumann will supervise production, planning and tooling, metallurgy and heat treat activities. Mr. Ely will direct activities in the foundry, engine factory, tractor factory and steel fabrication factory.

Charles W. Strine was named controller, **Pennsylvania Flexible Metallic Tubing Co.,** Philadelphia. For some years past he has been in charge of all accounting procedures with the company.

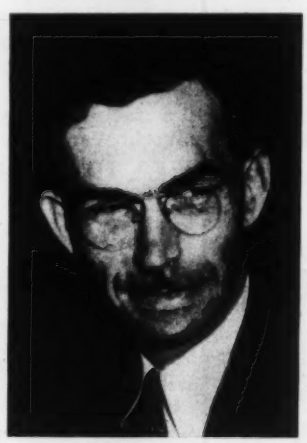
Kenneth G. Lundie was elected vice president in charge of sales, and **Perry Brown** was elected vice president in charge of engineering for **Johnston Pump Co.,** Los Angeles. Mr. Brown was chief engineer at Johnston, and Mr. Lundie was sales manager. Both men have been in the vertical turbine pump industry for many years, with Johnston Pump Co. and with other manufacturers.

Charles W. Fallon was appointed supervisor of **United States Steel Corp.'s** internal audit staff for the middle western area, with headquarters in Chicago. He succeeds **Chilton K. Ross,** who vacated the position upon his election Sept. 7 as comptroller of Gunnison Homes Inc., U. S. Steel subsidiary. Mr. Fallon since 1944 has been auditor, internal audit staff, U. S. Steel and subsidiary companies in Chicago.

Charles W. Frick was appointed works manager, propeller division, **Curtiss-Wright Corp.,** at Caldwell, N. J. **George E. Savaria,** former superintendent of machine shops and assemblies, was promoted to superintendent of steel blade manufacturing to fill the vacancy created by the death of **Russell Richardson. Warren P. Cross,** former superintendent of production machine shops, was promoted to superintendent of machine shops and assemblies, replacing Mr. Savaria. **Harold B. Snyder** was appointed superintendent of production machine shops succeeding Mr. Cross. Prior to joining Curtiss-Wright Mr. Frick was affiliated with Ford Motor Car Co. and Kaiser-Frazer Corp.

Continental Steel Corp., Kokomo, Ind., appointed **Byron L. Smith** district sales manager for Kansas, Nebraska, Oklahoma and western Missouri with headquarters in Kansas City. For the last six years he has been located in Oklahoma City as sales representative for Oklahoma.

Nelson A. Frahm was appointed national sales manager, **Alumatic Corp. of America,** Milwaukee, manufacturer



KENNETH G. LUNDIE
. . . vice-president-sales, Johnston Pump

PERRY BROWN
. . . vice president-engineering, Johnston Pump

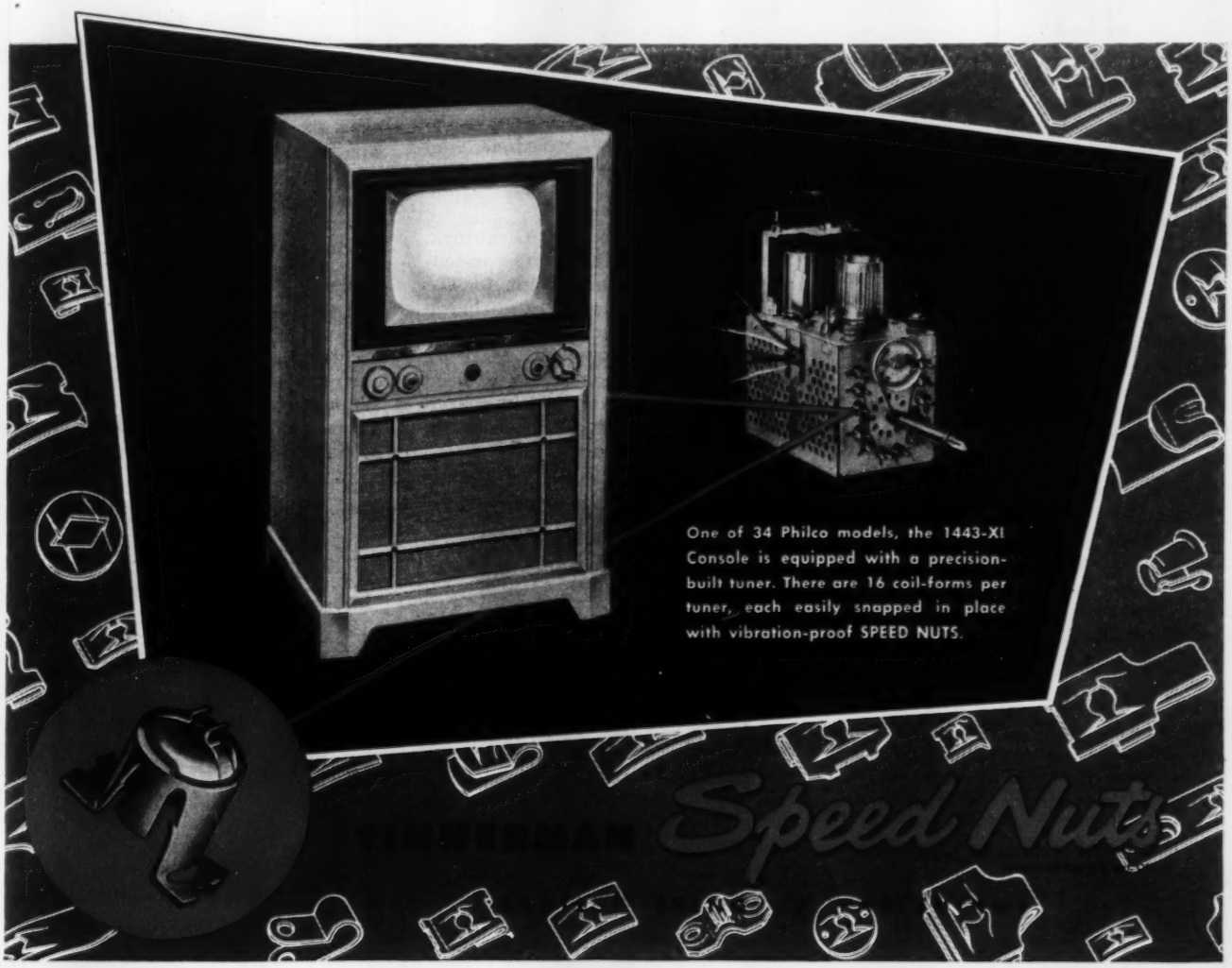
How PHILCO *tuned-in* Increased Production "Channel"

Simplified assembly of TV tuner helps PHILCO Corporation meet increased production requirements . . . and makes substantial savings in assembly costs.

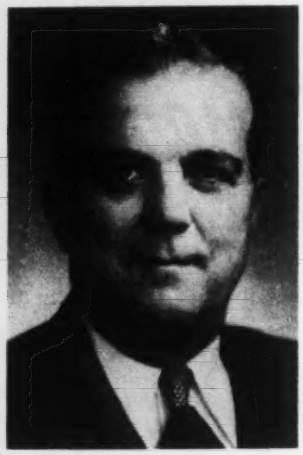
Now, with demands for TV skyrocketing and production schedules trimmed, the Philco Corporation has given SPEED NUTS a new, higher efficiency rating.

Reports show that Coil-form SPEED NUTS, used on high sensitivity tuners, *provide a 35% increase in production rate and an assembly savings of 20% over old coil-attaching methods!*

It may take a sharp pencil to figure ways to trim *your* production schedules and costs. Your Tinnerman representative would welcome an opportunity to try. Ask him to call—and write for your copy of "Savings Stories". TINNERMAN PRODUCTS, INC., Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Limited, Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales.


One of 34 Philco models, the 1443-XI Console is equipped with a precision-built tuner. There are 16 coil-forms per tuner, each easily snapped in place with vibration-proof SPEED NUTS.
TINNERMAN
Speed Nuts

of aluminum storm and screen windows.



JAMES P. KINNEY
. . . sales mgr., Yale & Towne Philadelphia div.

James P. Kinney, former partner in Gordon & Kinney Inc., Detroit, was appointed general sales manager, Philadelphia division, **Yale & Towne Mfg. Co.** He succeeds **Samuel W. Gibb,** resigned. Other appointments in that division include: **James A. Shellenberger,** formerly assistant to vice president-marketing, General Foods Corp., appointed director of advertising, publicity and market research. **John T. McCarley,** with Yale & Towne since 1936 in various engineering and factory management capacities, appointed manager of production, a new post, to direct production control functions for all product lines. **C. Eugene Moore,** formerly assistant to plant manager of the Electro-Motive Division, General Motors Corp., in Chicago, appointed works manager, a new post responsible for all manufacturing operations and maintenance of plant and equipment. **Bruno A. Moski,** formerly resident field engineer in the Philadelphia division representing the George H. Elliott Co., consulting engineering firm, appointed chief industrial engineer, a new post responsible for all plant industrial engineering functions. The company also annouces retirement of **Ellis H. Jones** as general manager, Canadian division, after 57 years of service, and appointment of **George L. Dirks** to succeed Mr. Jones.

Hanson - Van Winkle - Munning Co., Matawan, N. J., appointed **Almo D. Squitero** to the post of electrochemist in its laboratory.

Dr. James L. Lawson was named manager of the newly formed electron physics divisions of the research laboratory of **General Electric Co.,** Schenectady, N. Y. **Clifford G. Fick** was named assistant manager. The divisions include the electron tube division, with **E. D. McArthur** as head; the x-ray division, headed by **Dr. Ernest E. Charlton;** the nuclear physics division, of which Dr. Lawson is head; and the communications research division under Mr. Fick.

Sidney L. McLean was appointed tax supervisor, **Columbia Steel Co.,** San Francisco, subsidiary of U. S. Steel Corp. He succeeds **Byron Shelton,** transferred to the tax staff of United States Steel Corp. in New York.

White Motor Co., Cleveland, appointed **Wyman L. Henry** sales manager of the "3000" division. He has been with O. A. Sutton Corp., Wichita, Kans., as vice president in charge of sales. **Karl A. Roesch** was appointed assistant wholesale manager of the company's national sales staff.

M. A. Moore was appointed sales and service representative for **Double Seal Ring Co.,** Ft. Worth, Tex. He will cover Vermont and New Hampshire, with headquarters in Georgetown, Me. Mr. Moore previously was with General Motors Corp. as supervisor of sales and service of diesel engines in Houston.

Perfection Stove Co., Cleveland, appointed **Robert K. Guy** service manager, cook stove and heater division, to replace **Donald W. Milestone,** who was made export manager for the company.

Laminated Shim Co. Inc., Glenbrook, Conn., announces changes in executive personnel: **Richard Seipt,** for the last ten years vice president in charge of sales, will now serve as vice president and general manager. **Merle L. Lockwood** was appointed to succeed Mr. Seipt as vice president in charge of sales. **Michael E. Errico** was appointed sales manager.

RICHARD SEIPT
. . . V. P. & gen. mgr., Laminated Shim Co.

William A. Bohlander was appointed factory manager, **Hydraulic Press**

WILLIAM A. BOHLANDER
. . . Hydraulic Press factory manager

Mfg. Co., Mt. Gilead, O. He was with Aetna-Standard Engineering Co. as superintendent and spent 18 years as master mechanic in charge of maintenance at Jones & Laughlin Steel Corp.

Ohio Steel Foundry Co., Lima and Springfield, O., appointed **A. W. Anderson** Pittsburgh district sales representative replacing **Harry S. Ransom,** retired.

A. C. Staley Jr. was appointed manager of sales for the Pacific division of **American Can Co.,** with headquarters in San Francisco. He succeeds **Dr. R. H. Lueck** who was named general manager of research with headquarters in New York.

William R. Boggess was appointed assistant manager of sales, fractional horsepower motor divisions, **General Electric Co.,** with headquarters at the company's Ft. Wayne, Ind., works. **William N. Oberly** was appointed assistant to **Lisle D. Hodell,** manager of manufacturing of the divisions, and

MERLE L. LOCKWOOD
. . . Laminated Shim vice president-sales

will also be located at the Ft. Wayne plant.

In addition to his present duties as chief engineer, refrigeration division, **Bowser Inc.,** at Terryville, Conn., **Thomas J. Lopiccolo** was appointed general sales manager of the division, co-ordinating all technical sales and application engineering. **John Zaleski** was appointed exclusive distributing agent for government sales for the division, and **Dr. John Gelb,** Chicago research engineer, is now associated with the division as research and development engineer.

David Meeker, director of education for **Dearborn Motors Corp.,** Detroit, was promoted to Pacific Coast sales manager to fill the vacancy caused by the death of **A. F. McGraw.**

Plastic & Rubber Products Co., Los Angeles, was incorporated under the same name and will operate under the same management and key personnel. The following officers direct the operation: **MacNeel Pierce,** president; **Thomas B. Keenan,** vice president; and **Pearl Nyman,** secretary-treasurer. **M. A. Brown** continues as manager, Chicago office.

Hudson Phillips was named director of public relations for **Consolidated Vultee Aircraft Corp.,** San Diego, Calif. He has been acting director since mid-June, and continues as an associate with H. A. Bruno & Associates, New York, which organization has been public relations counsel for Convair for nearly three years.

Ralph A. Mumert was appointed a sales engineer with **F. J. Hearty & Co.,** Los Angeles and San Francisco, West Coast representative for Edward Valves Inc., East Chicago, Ind. Mr. Mumert formerly was with Keenan Pipe & Supply Co. He will be located in Los Angeles.

MARIO A. GARDNER

. . . vice president-purchases for Air King

Mario A. Gardner, formerly director of purchases, **Air King Products Co. Inc.,** Brooklyn, N. Y., was elected vice president in charge of purchases.

R. A. Juusola, formerly supervisor of industrial engineering, was appointed plant manager for the weld, wire and small parts operations at the parts division in Warren, Pa., of **Sylvania Electric Products Inc.**

Hunt - Spiller Mfg. Corp., Boston, placed **Louis R. Robinson** in charge of its cost control section.

Joseph D. Lovely was named chief engineer, Airtemp Division, **Chrysler Corp.,** at Dayton, O., to succeed **Charles F. Porter** who returned to the central engineering staff in Detroit.

A. R. Gaus was appointed assistant to the vice president in charge of sales, **Midvale Co.,** Philadelphia. He has represented the company in the Pittsburgh office since 1937, and will now be stationed in the Nicetown, Pa., offices of the company.

DONALD L. ANDE

. . . mgr.-sales, warehouse products, J & L

Jones & Laughlin Steel Corp., Pittsburgh, appointed **Donald L. Ande** manager of sales, warehouse products. He formerly was Baltimore manager, U. S. Steel Supply Co.

E. W. Bliss Co., Toledo, O., appointed **M. R. Hatch** as a chief engineer in its press division. His primary responsibility is development and production engineering work on large single-action mechanical presses.

Joseph J. Marsalka, for the last five year research laboratory supervisor, Blaw-Knox Co., Pittsburgh, was appointed technical director of **Roll Manufacturers Institute,** Pittsburgh. Before joining Blaw-Knox he was affiliated with Rustless Iron & Steel Co., Baltimore, and Timken Steel & Tube Division of Timken Roller Bearing Co., Canton, O., as a research metallurgist.

Dr. Zay Jeffries, former vice president, General Electric Co., Schenectady, N. Y., was appointed Leonard Case professor and consultant on education policy on the faculty of **Case Institute of Technology,** Cleveland.

OBITUARIES...

B. H. Jones, 61, vice president in charge of sales, **National Screw & Mfg. Co.,** Cleveland, died Sept. 21. He had been associated with the company since 1925 when he entered the organization as secretary to the president. In 1941 he was appointed assistant vice president and assistant sales manager, and in 1948 he became vice president in charge of all sales.

Leo Ranney, 66, inventor, died at his home at Morro Bay, California. He held over 3000 patents for his inventions, among the more notable that for horizontal drilling for oil and water, and for underground gasification of coal. During World War II he developed the Ranney Water Collector System for supplying pure iron-free water to ordnance plants.

George C. Adams, 59, sales representative for **Joseph T. Ryerson & Son Inc.,** Chicago, died Sept. 14. He was with the company 38 years, the major portion of this time as sales representative in the Chicago metropolitan area.

Ernest S. McClary, 66, secretary and treasurer, **E. W. Bliss Co.,** manufacturer of heavy industrial machinery with offices in New York, died at his summer home in Huntington, N. Y., Sept. 23. He was with Bliss for 17 years, and also had association with Geometric Tool Co., Westville, Conn., and Bridgeport Brass Co., Bridgeport, Conn.

William J. Walters, 45, factory manager, **Ingersoll Steel Division,** Borg-Warner Corp., Chicago, died Sept. 18.

Elliott L. Jones, 37, head of **Industrial Steel Parts Corp.,** Jamestown, N. Y., died Sept. 14. Formerly purchasing agent for Swanson Machine Co. in Jamestown, Mr. Jones left that firm to organize Industrial Steel Parts Corp.

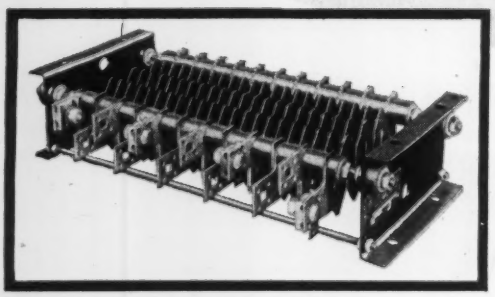
Save on Up-keep

with

TRADE MARK

E&M TAB-WELD PLATE RESISTOR

PATENT NO. 2,378,194



ALSO IMPORTANT—

1. Negligible change in resistance values between hot and cold.
2. Corrosion resistant, non-breakable alloy steel.
3. Closely spaced, convenient tap-plates.
4. Uniform mounting dimensions.
5. Standard Mill Sections have same size grid throughout.

NO BURNING AT GRID-EYES OR TAP-PLATES

NO TIGHTENING OF END CLAMPING NUTS

Here's a *PLUS VALUE* in resistors—more time for the maintenance crew to inspect, check, adjust and maintain other units of the motor drive . . . no need to fear burning will occur in concealed areas. EC&M TAB-WELD Plate Resistors will quickly pay for themselves through reduced upkeep expense.

Look at the view above showing a standard section from which the support rods and spacers are removed. *The electrical path remains unbroken.* These EC&M TAB-WELD Plate Resistor sections are available in continuous capacity ratings from 32 to 150 amperes *without internal* paralleling. When desired, *external* paralleling is easy where larger capacities are desired. Remember, too, there are only 9 different grid sizes for the entire 32-150 ampere range.

Make your own layouts with EC&M Bulletin 942-A TAB-WELD Plate Resistors

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering
NEWS AT A GLANCE

STEEL AIDS TV INDUSTRY—A new stainless steel alloy developed by Carnegie-Illinois Steel Corp. is one reason why larger, rectangular television tubes are on the market. The steel, containing 17 per cent chromium, was developed by the U. S. Steel subsidiary when approached by a leading TV manufacturer. Some 90 heats of steel were tested to develop an alloy that satisfied exacting requirements of the manufacturer. Biggest job for metallurgists was stabilizing the grain structure of the steel so its expansion and contraction characteristics closely coincided with those of glass, at the same time remaining easy to form and strong enough to withstand pressures caused by vacuum.

THE ATOM AT WORK— A glimpse of the work-producing potentialities of the harnessed atom was provided those visiting the Westinghouse atomic show at Chicago Coliseum last week. Among other developments, the "theater of the atom" revealed how atomic energy may be used to drive the motors of tomorrow. One demonstration included a pigmy atom smasher only three feet high hooked electrically to a plastic wheel. Charges leaping across from the smasher to copper spheres on the wheel sent it spinning around at speeds up to 100 revolutions per minute.

WATCH CONTROL LOCATIONS— More control jobs are bungled through improper location and installation of temperature-responsive elements than through any other single cause, according to Partlow Corp., New Hartford, N. Y. In long ovens, furnaces or processes through which the work travels, the company says, it is wise to use multiple controls, each controlling a separate group of burners or heating elements. One control may govern rapid heatup of incoming cold work; another the soaking temperature; and a third the work discharge level. To maintain a temperature gradient in a long oven, multiple control is almost always essential. A single control point takes too much for granted at remote points.

NEW AID FOR SCIENTISTS— High precision measurements in a number of special analysis problems can be made with a new type mass spectrometer tube developed by General Electric Co., Schenectady, N. Y. The new tube, called an ion resonance mass spectrometer tube, is expected to aid scientists in the analysis of chemical compounds, especially gases. GE says it has a sensitivity comparable to conventional spectrometers, and its resolution is very high at low masses.

SNARL GUARDS DO THE JOB— Good place to get in a "tangle" seemingly is in the vicinity of a fine wire drawing machine where its pick-up spool spins so fast it looks like it's standing still. Reason why snarls never develop is the precise, spilt-second control that keeps each machine running smoothly, stopping them if trouble develops. In the plant of Gilbert & Bennett Mfg. Co., Georgetown, Conn., for example, each fine wire drawing machine is equipped with a snarl safety switch that stops its motor if the wire snarls as it comes from the supply tub. The vertical spindle machine has a similar arrangement at the entering end, and a no-load relay at the finishing block to shut down the machine automatically if the wire breaks or runs out.

WATCH TOOL DESIGN—Tools improperly designed can interfere with production to a degree seldom appreciated by tool designers or even by management itself. Designing chiefly falls down in the inability of the shop man to use the tool in the most effective manner. Time studies in some plants, for example, show that more time is often required to get the work out of a die than to perform the operation—due to sticking or some other cause. One way to lick such slowups is to have the design and process engineering departments get together more frequently—ironing out the bugs before the tools are made. (p. 82)

NO TRIMMING LOSS — Modified method of holding stainless steel sheets on the table of a polishing machine, developed by Atlantic Brass Works Inc., Chicago, not only assures full polishing, but also eliminates scrap loss resulting from trimming unpolished portions under the old setup. Concerns fabricating soda fountain, restaurant and other equipment which utilize Atlantic's services also are assured of matching sheets. (p. 86)

TEMPORARY SETUP BUT EFFECTIVE — By using available welding equipment, one company welded seventy-six superheater tubes at a profit —without tying up a lot of other equipment in the operation. Operation, which with a larger production run would have justified installation of a fully automatic unit, involved the use of two welding guns that made continuous welds while the work was passed under them at a constant speed of 22 inches per minute. (p. 94)

OIL FEEDING IMPORTANT—Studies by the National Bureau of Standards reveal that behavior of plain journal bearings is greatly influenced by methods of feeding oil through the bearing shell. Method of admitting oil to the bearing, it says, is an important design problem. Fundamentally, concept of the load-carrying film indicates that it is desirable to avoid oil holes or grooves which interfere with the normal development of hydrostatic pressure to support the load. This, however, is not always possible. (p. 104)

By N. M. PERRIS and H. K. KEEVER
Stevenson, Jordan & Harrison Inc.
New York

Make Tool Design More Effective

By evaluating tool designs before tools are made, management can be sure of getting the most for its money. Great savings are possible both in the cost of the fixture and through increased production. Tool designers can check the probable effectiveness of their work using "element time data"

IMPROPERLY designed tools can interfere with production to a degree seldom appreciated by tool designers or even by management itself. Such interferences may be minor in themselves, yet the cumulative effect in total product manufactured may be great because they may destroy the fine balance of suboperations.

Little fault can be found with the work of the American tool designer so far as ideas are concerned. Accuracy, reliability and interchangeability of the part, are constantly in his mind.

Production Factors Affected by Tool Design—Tool design falls down in the inability of the shop man to use the tool in the most effective manner. Studies in metal trades plants show that five fundamentals should be periodically reviewed by the tool design organization. In fact, frequent consultation between tool design and process engineering departments produce increases in production heretofore unintentionally neglected. The five fundamentals are: Method of holding the part in the fixture; actual cutting of the piece, i.e., assistance given toward increasing metal removal through rigidity of the fixtures; decreasing assembly difficulties through assistance of the tool designer's attention to manufacturing details; adding unnecessary design complication is usually the result of the tool designer taking too long a range of view of the use of this design; use of standard time data to determine economy of design.

Method of Holding Part—Much time can be saved and production increased by paying more attention to the method of holding the part in the fixture. Method of alignment and location with reference to other surfaces has a great bearing on the cost of production.

When parts are located on studs, the tool designer should strive for quick and positive action. Close tolerances should not be held where they are not necessary. We have in mind a job where a tolerance of 0.001-inch was held between the stud size and the locating hole, yet the relationship called for on the drawing showed a 0.003-inch tolerance on that dimension. After changing the stud size, time to locate the part was reduced from 0.19 minute to 0.11 minute, a saving of 42 per cent.

The length of the stud may have a bearing on the time, as the stud should not be longer than necessary for the accuracy needed.

Keep Clamps to a Minimum—Number of clamps and work holding times should be kept at a minimum still maintaining the requirements for rigidity and accuracy. To put more clamps than needed on the fixture is a waste of money. Yet in some plants there is a tendency on the part of tool designers to do just that. The worker using the fixture soon learns which clamps are the important ones and disregards the rest.

If the methods and rate department used the tool drawing to set the piece work price, the piece rate will be unnecessarily loose because the worker need not use more clamps than necessary.

The table gives some idea of the amount of time required for different types of clamps. While these values may appear small, continued use of the fixture in the plant makes minor savings well worth while.

Selection of the type of holding mechanism (bolt and clamp) etc., should be made taking into consideration the extent the fixture will be in use. For infrequent use, the most economical type from the standpoint of first cost should be considered. Where the time to clamp the part is small in proportion to total machining time, the type of clamp used is also relatively unimportant.

Time to Handle Important—Time to handle the part is also an important consideration in some stamping operations, particularly secondary press operations. Time studies in some plants show more time is often required to get the piece out of the die than to perform the operation due to pieces sticking. By rearranging stripper plates in some cases, it is possible to air-eject the work and eliminate a large part of the handling time. Savings in time as great as 46 per cent of the total operation time have been obtained by studying these operations.

Ease of cleaning is another significant factor in the design of jigs and fixtures. Whenever possible, jigs and fixtures should be almost self-cleaning. Openings in the fixture help materially in the disposal of chips, and elevated or raised locating surfaces may be designed so that the chips fall away on tapered surfaces.

With the present high rate of metal removal

through the use of carbide tools, the time required to cut has been greatly reduced. Thus, the number of times to handle the part and to clean the fixtures begin to assume a much greater proportion of the total time. For this reason, tool engineers should give more attention to the problem of chip disposal.

Actual Cutting and Machine Time—Actual cutting time is often increased because of the jig or fixture design. Parts are sometimes held in the fixture so that the approach of the cutter to the work is greater than necessary.

Interference due to projecting fixture clamps will increase the length of cut and reduce production output. As an example of fixture interference in Fig. 1, the design of the fixture with the projecting clamp required a length of cut approximately twice as great as necessary after the fixture was redesigned. The old fixture with the projecting clamps made it necessary to use a shell end mill and traverse around the periphery of the casting.

Fixture shown under "new method," Fig. 1, was redesigned by lowering the projecting nut through the use of simple step clamps. This permits the use of a large face mill, cutting the entire surface at one pass. Distance traversed using the old method amounted to approximately 38 inches, while under the new method a 21-inch traverse was required, which resulted in a saving of 46 per cent of the cutter traverse distance.

Cutter Approach Reduced — Such parts as links, forks and levers, held in fixtures to mill bosses, sometimes are placed so a maximum amount of cutter approach is required. Such parts should be held so as to cut directly at the boss and not sideways, Fig. 2. A study of this type of cutting was made on a number of these parts, which resulted in a savings in time due to cutter approach of 16.5 per cent. Diameter of slab mill used also has a great effect on approach, i.e. an increase in the diameter from 3 to 5 inches results in a 30 per cent increase of approach distance.

In some cases, approach may be reduced by holding two or more parts together in the fixture. The approach needed is the same as for one piece and the savings are in proportion to the number of pieces held in the fixture at one time.

Due to improper holding of the work, cutting feeds have to be reduced. Weak or frail castings must be supported where springy. It is not always possible to accomplish this, but often too little thought is given to the resulting effect on the reduction of feeds and speeds. Cutting feeds often have to be cut in two due to improperly supported pieces in milling fixtures.

3. Decreasing Assembly Difficulties—One common fault found in many plants is that tool designers are given an order to design a tool for a part and little thought is given to the final assembly. Tool designers

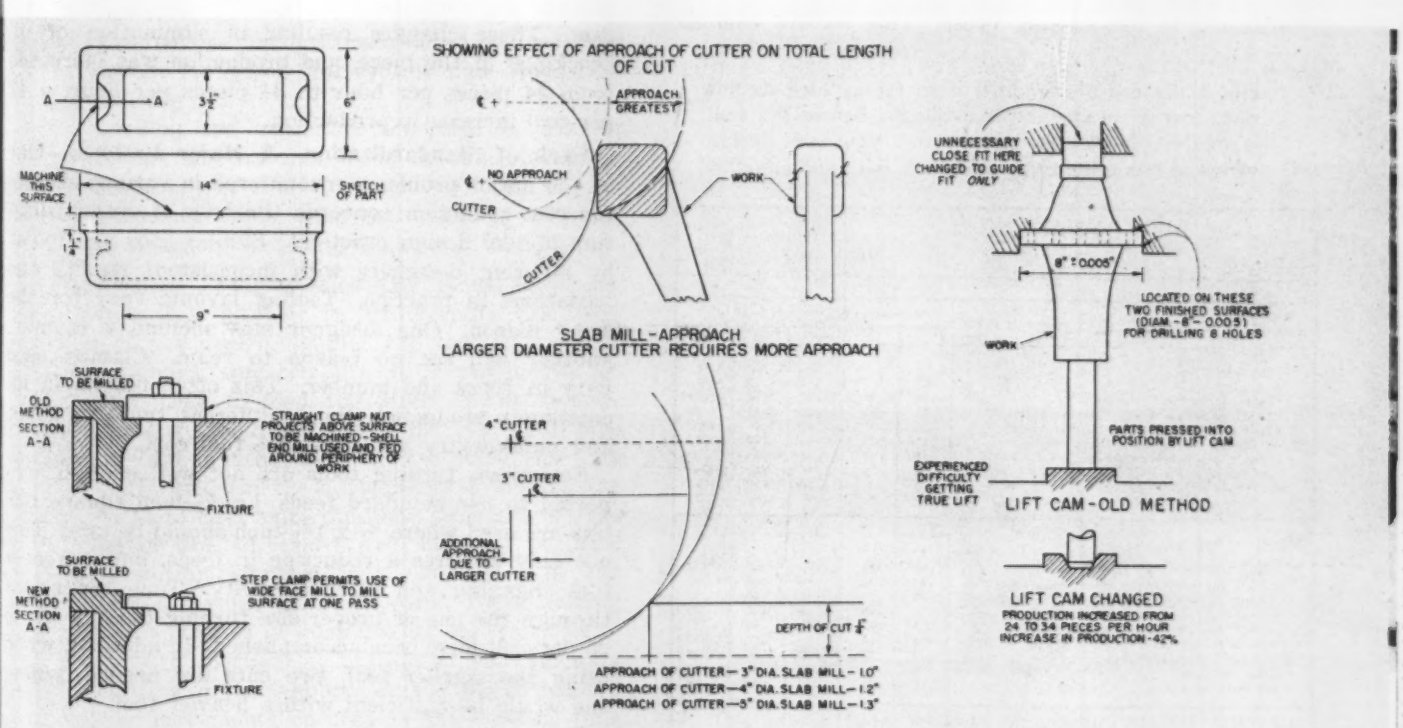

A
A
3½"
6"
MACHINE THIS SURFACE
14"
SKETCH OF PART
1¼"
9"
SURFACE TO BE MILLED
OLD METHOD SECTION A-A
STRAIGHT CLAMP NUT PROJECTS ABOVE SURFACE TO BE MACHINED - SHELL END MILL USED AND FED AROUND PERIPHERY OF WORK
FIXTURE
SURFACE TO BE MILLED
NEW METHOD SECTION A-A
STEP CLAMP PERMITS USE OF WIDE FACE MILL TO MILL SURFACE AT ONE PASS
FIXTURE
SHOWING EFFECT OF APPROACH OF CUTTER ON TOTAL LENGTH OF CUT
APPROACH GREATEST
NO APPROACH
CUTTER
CUTTER
WORK
SLAB MILL-APPROACH
LARGER DIAMETER CUTTER REQUIRES MORE APPROACH
4" CUTTER
3" CUTTER
ADDITIONAL APPROACH DUE TO LARGER CUTTER
DEPTH OF CUT
APPROACH OF CUTTER—3" DIA. SLAB MILL—1.0"
APPROACH OF CUTTER—4" DIA. SLAB MILL—1.2"
APPROACH OF CUTTER—5" DIA. SLAB MILL—1.3"
UNNECESSARY CLOSE FIT HERE CHANGED TO GUIDE FIT ONLY
8" ±.0005"
LOCATED ON THESE TWO FINISHED SURFACES (DIAM. 8"—0.005) FOR DRILLING 8 HOLES
WORK
PARTS PRESSED INTO POSITION BY LIFT CAM
EXPERIENCED DIFFICULTY GETTING TRUE LIFT
LIFT CAM-OLD METHOD
LIFT CAM CHANGED
PRODUCTION INCREASED FROM 24 TO 34 PIECES PER HOUR
INCREASE IN PRODUCTION-42%

Fig. 1 (left)—Example of fixture interference. Design of fixture with projecting clamp required a length of cut approximately twice as great as was necessary after the fixture was redesigned. Travel of cutter—old method 38 inches, new method 21 inches, saving 17 inches or 46 per cent. Fig. 2 (center)—Such parts as links, forks and levers, held in fixtures to mill bosses, should be held so as to cut directly at the boss and not sideways. Top, showing effect of approach of cutter on total length of cut. Bottom, slab mill approach; larger diameter requires more approach. Fig. 3 (right)—Drawing illustrates tendency to over-design. The jig was designed to employ a lift cam to raise the large casting against the locating surfaces of the flange. Design changes resulted in the elimination of all "cocking" of the piece; production was increased from 24 pieces per hour to 34, a 42 per cent increase

should not always be blamed for difficulty in assembly. Engineering designers are careless with dimensions and tolerances on parts and do not show important assembly relationships. The tool designer designs the tools to make the part. If he does not know how it is to function with the mating part, interferences result in assembly that cause extra costs due to excessive fitting. In addition, interchangeability of parts is lost.

Sometimes tools are made so as to locate from semi-finished surfaces. When such surfaces are finished, additional work is required in assembly because of the loss of true relationship in final machining.

Excessive Fitting Necessary—In one plant, a machine bed was located on finish planed ways to drill and mill the part. When the finish planed ways were scraped and fitted, the relationship between the ways and the drilled and milled surfaces was lost. An excessive amount of fitting in assembly was required to compensate for the distortion. The fixture could not be changed because of the cost involved. If the tool designer had taken this into consideration when the tools were designed, considerable saving of time assembly would have resulted.

Tools and fixtures for use in assembly operations are often as effective in reducing costs as in machine operations. In one assembly job, three workers were required to work as a unit to assemble small parts. Two of the girls assembled the parts while the third girl fastened the assembly using a small staking press. A rotary assembly fixture was designed and attached to the staking press. This fixture enabled one girl to do the assembly work of the other two, and the rotary fixture automatically tripped the press, fastening the work together. This fixture reduced the labor time required for this operator 66 2/3 per cent.

Fig. 4—By use of standard data tables such as this one, cost of production is available before the tool is made. From this information, you can decide which of two alternative designs is the most effective

RADIAL DRILL

STANDARD DATA – MINUTES

PLACE AND REMOVE
Arm 4' and Over

WEIGHT OF PIECE POUNDS – UP TO→	BY HAND		BY CRANE		
	25	50	400	1000	OVER
TABLE					
Place and Remove Piece only	.20	.30	1.50	2.50	3.00
Place and Remove Piece with (1) Clamp	.40	.50	2.00	3.10	3.50
Place and Remove Piece with (2) Clamps	.50	.75	2.40	3.40	4.00
add for additional clamps (each)	.25	.30	.40	.40	.40
Clean Table (when required)	.15	.20	.30	.40	.40
Add for Adjustable Jacks (each)	.30	.30	.35	.40	.40
Turn over Piece 90°	.15	.25	1.00	1.50	2.00
180°	.20	.35	1.50	2.00	3.00
JIG OR FIXTURE					
Place and Remove – (1) Adjustment	.55	.80	2.00	3.00	3.50
add for additional adjustments (each)	.20	.30	.40	.40	.40
add for all clamps (each)	.25	.30	.40	.40	.40
add for open and close cover–hinged	.10	.15	.25	.30	.40
add for open and close cover–loose	.20	.40	.50	.60	.70
Turn over 90° per Turn	.15	.20	.50	.80	1.00
180° per Turn	.20	.25	1.00	1.50	1.75
Clean Fixture	.15	.20	.30	.40	.50
Eye Bolt in and out	.20	.30	.50	.50	.50
VISE					
Place and Remove – to use	.40	.60	–	–	–
Place and Remove to Vise and Line up	.60	.90	–	–	–
Clean Out Vise	.15	.20	–	–	–
ANGLE PLATE					
Piece to Angle Plate – (1) Clamp	.60	.80	1.50	–	–
Additional Clamps or Adjustments	.30	.40	.50	–	–
Align with Scale or Level – add	.30	.40	.50	–	–
TEMPLATE					
Duplicate Part used as Template	.40	.60	1.50	2.00	2.50
Mating Part used as Template	.50	.70	2.00	2.50	3.00

	SMALL	LARGE	CRANE
Place and Remove to Piece	.30	.40	1.50
add for clamps (each)	.30	.40	.50

Unnecessary Design Complications — One of the fundamental reasons for designing tools is to maintain or improve the quality of product. Also, tools are necessary to maintain interchangeability of manufacture wherever tolerances are close. These considerations often cause the designer to over-design with a resulting increase in cost of the fixture and an increased cost of manufacture when the tool is used in the shop.

Too Many Locating Surfaces—Fixtures are sometimes designed with too many locating surfaces. On irregular castings locating from the rough surface, a three-point contact is usually all that is required. In fact, more locating points, even with the use of adjusting screws, tend to distort the casting.

This tendency to over-design is illustrated by Fig. 3. The jig was designed to employ a lift cam to raise the large casting against the locating surfaces of the 8-inch +0.003-inch flange. In addition, a close tolerance was held in the top hole for the end diameter. Experience with the fixture developed difficulty by getting the piece "cocked" in the fixture.

The designer in his eagerness to maintain squareness used too many locating surfaces. The top locating hole was enlarged so as to guide the piece only and the flat elevating cam was changed to a beveled cam. These changes resulted in elimination of all "cocking" of the piece, and production was increased from 24 pieces per hour to 34 pieces per hour, a 42 per cent increase in production.

Lack of Standardization—A Major Problem—One of the major problems encountered in various studies for cost reduction concerns the lack of standardization of tool design practices. Similar jobs are tooled by different designers with inconsistent results and variations in practice. Tooling layouts vary for the same reason. One designer may include a reamer; another will see no reason to ream. Clamps used vary in types and number. This often results in inconsistent production times, different types of tools and unnecessary and excessive tool cost.

Sometimes turning tools are not well enough supported to use standard feeds, i.e. $\frac{5}{8}$-inch square tool bits are used where $\frac{3}{4}$ x $1\frac{1}{2}$-inch should be used. This not only requires a reduction in feeds, but increases tool changing and affects quality. Time reductions through the use of proper size turning tools of up to 25 per cent have been accomplished. In addition, when using the smaller tool, two cuts are needed, where one would be sufficient with a heavier tool.

Design Costs Controlled—It is important that tool design cost be controlled by making sure that: 1. Tools are necessary. 2. The best tools are provided. 3. Predetermined costs and gains are surveyed before new tools are approved.

After poor tools are made and put to use, there is endless trouble with wage incentive standards. Usually the relationship tolerances will not permit changes to be made because of the additional expense

TIME REQUIRED FOR DIFFERENT TYPES OF CLAMPS

Type of bolt or clamp	Standard time per occurrence—(minutes)
Spoke Nut	0.12
Hand Wheel	0.11
Star Knob	0.09
Hand Cam	0.07
Tail Knob	0.16
Bar Nut	0.16
Back-up Screw	0.10
Quick Acting Clamp	0.04

involved. When the tooling appropriation is exhausted, it is usually difficult to secure additional funds for the desirable changes mentioned above.

Many manufacturing organizations have a real need for better co-ordination between engineering, production, tool design, standards, material handling and tool services. Normally these divisions handle their responsibilities to suit their own needs. A closer co-ordination of these activities will lead to a better understanding of their mutual problems and result in a lower cost of overall operations.

Use of Standard Time Data for Economy of Design—During the past 30 years, industrial engineers have been making time studies on many different kinds of operations. As a result of these studies, standard time values have been developed for each small part of any operation known as "elements". These element times have been classified into four major classifications.

1. Machine movements such as:
   a. Adjust to cut; b. return from cut; c. rapid traverse; d. index, etc.
2. All machine cutting times based on feeds and speeds for given horsepower and economical tool life
3. Loading and unloading the piece in and out of jigs and fixtures. Also the time to clamp, position, etc.
4. Assembly times, such as fastening one part to another, fastening bolts and nuts, etc.

Effectiveness Predetermined—By using such element times, it is possible to predetermine the effectiveness of the design. Either the tool engineer or method engineer can compute with reasonable accuracy, the time to load the piece in the fixture, position, clamp solid, cut, etc. He can determine whether or not it is advisable to use quick clamping methods. He can test the advisability of making the fixture so as to hold more than one piece and can decide whether the increased cost may be justified by the resulting increase in production. He can determine the savings that will result by combining cuts through the use of combination cutting tools.

Anyone with mechanical perception can visualize the fabricating or assembling of the piece through the various movements covered in the element time tables. Several examples of these data are shown in Fig. 4. By use of these and other standard data tables, the cost of production is available before the tool is made. From this information, a decision can be made as to which of two alternative designs is the most effective.

The same data the shop uses to plan their work and determine their operating efficiencies are available to all staff departments interested in design.

Pendulum-Suspended Milling Unit Restores Contour to Railroad Locomotive Wheels

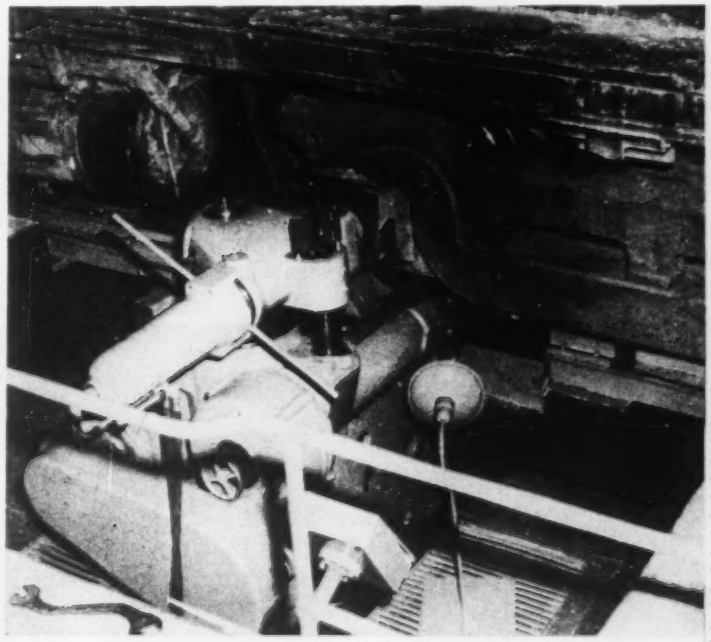
ENTIRELY new approach to a milling operation is provided by a machine which restores worn railroad diesel locomotive wheels without removing them from the locomotive. Wheels in a locomotive unit can be reconditoned easily in less than one working shift using only two men operating the machine.

Milling unit on the wheel truing machine, designed and developed by Standard Railway Equipment Mfg. Co., Chicago, is actually suspended on a pendulum. This makes possible setting the machine to the diesel engine as a workpiece.

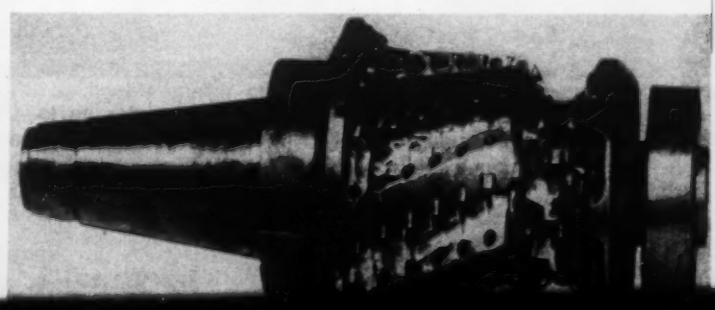
Cutters are unique and involve a milling cutter design utilizing indexable cylindrical carbide inserts requiring no regrinding. The cutters restore proper contour to wheel's tread and flange in one operation.

The pilot machine has been in continuous service in a railroad shop for almost a year.

Diesel locomotive wheel in position over cutter of wheel truing machine



This unique cutter involves an unusual milling cutter design utilizing indexable cylindrical carbide inserts requiring no regrinding



"FULL POLISHING"

Stainless Sheets Eliminates Trimming Loss

Improved method of holding work on polishing machine table makes it possible for one company to polish the full surface of sheets and plates up to 49 inches wide and 14 feet long

FABRICATORS of stainless sheets like soda fountain, restaurant and other equipment makers now enjoy a plus service at Atlantic Polishing Mill Co., Chicago.

The company, a division of Atlantic Brass Works Inc. which specializes in polishing stainless, developed a new method of polishing full surfaces of sheets—eliminating scrap loss resulting from trimming unpolished portions under the old setup. Now, concerns using Atlantic's services, not only are assured of matching sheets from one source, but also materials savings.

Development consists of a modified method of holding sheets on the table of the polishing machine. Devised by R. Chaplik, executive vice president of Atlantic, the holding method presents each sheet to the polisher in such a manner that the full surface is polished at all times.

Many Finishes Provided—Work processed for customers by the company ranges from a few to hundreds of sheets. Finishes specified usually are the bright, ground and polished No. 4 finish, the No. 7 buffed or other standard finishes customarily used by the trade.

Atlantic's capacity in its new modern plant, which it now shares with the parent company is about 500,000 pounds of stainless sheets per month. Its facilities include two up-to-date polishing machines, built by Mattison Machine Works, Rockford, Ill., accommodating sheets up to 14-feet long. One is a 36-inch unit and the other a 48-inch. These machines are capable of polishing 1-inch wider than these dimensions. Furthermore, they will polish sheets from 26-gage, the lightest ordinarily used, up to plates ½-inch thick.

Full surface of stainless sheets and plates up to 49 inches wide and 14 feet long is polished on this machine. Full-polishing feature eliminates trimming loss for the fabricator

Abrasive Belt Polishes—As observed from the accompanying illustration of the larger machine, polishing is performed by an abrasive belt running on four rolls. The top and two end rolls are steel idler rolls, the bottom one is the driven rubber-covered contact roll. Belt tension is maintained by elevating the top roll. Immediately beneath the contact roll is a steel Billy roll. Between these two rolls the sheets are ground and polished as they are passed back and forth by the table. During the polishing operation, the belt oscillates laterally approximately ½-inch. The machines are V-belt driven by constant speed motors. A 40-hp motor is used on the smaller machine and 50 hp on the larger.

Sheets are received in the plant in flat wooden boxes with paper separators between sheets. One at a time, these are placed on the machine table for polishing, then removed. Loading and unloading requires the service of three or four men, depending upon length of the sheets. After polishing, sheets are cleaned by dusting with whiting and wiping off with a soft cloth. They are then interleaved with new paper and repacked in original boxes.

Belts Changed Fast—To obtain the type of finish required, it sometimes is necessary to pass the sheets through the machine several times and to utilize belts of varying grit. Belt changes are made in a matter of a minute or two. Orders frequently call for polishing on both sides to the same finish. However, when polish on one side only is specified for light gage sheets, it is customary to rough grind the back side. Sheets are said to be just as flat after polishing as when they were received.

To assist the user in identifying quickly the finish on the sheets contained in the boxes, the company applies tags, the color of which designates the finish. For those not familiar with the color index, markings are clearly imprinted on the tags.

In addition to the equipment for polishing stainless sheets and plates, the company also has facilities for polishing tubes and bars.

Accurate Piercing Keeps Assembly Line Moving

Special machines, master patterns and stop gages are important aids at McCray Refrigerator in preventing rejects and assuring a smooth flow of refrigerator components

PIERCING and blanking are two important steps in processing metal refrigerator parts. Although the work involves many standard and special machines, chief requirement is accurate performance to insure a smooth flowing assembly line.

At McCray Refrigerator Co., Kendallville, Ind., multiple punching machines are employed in its precision piercing operations to keep production rolling.

Holes in Any Combination—The units, which take steel blanks directly from the shears, produce any hole or combination of holes through use of hardened steel punches and die buttons.

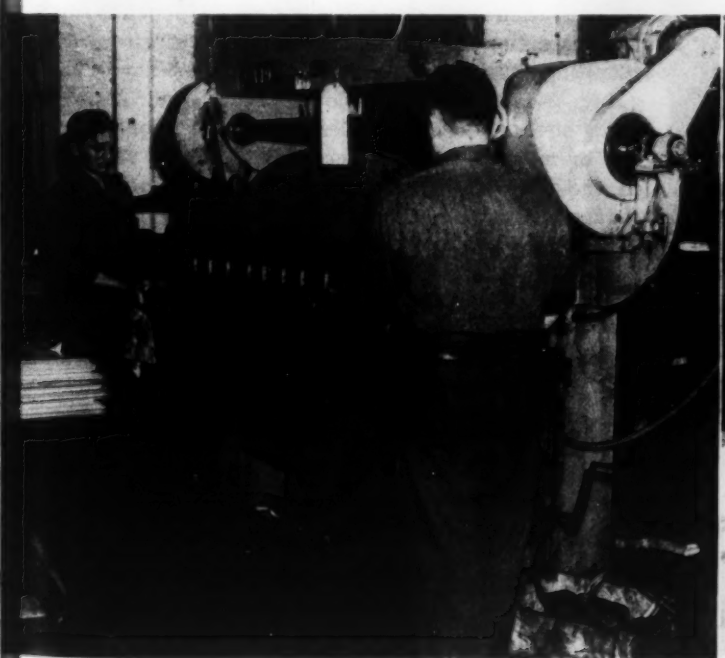
Standard hole sizes range from ⅛ to ⅝-inch diameter, and the number of holes produced simultaneously in any particular part is limited only by the press bed length and throat, horsepower and thickness of the metal to be pierced.

Punches and dies in each of the machines used are set up by an operator in relation to holes provided in a master pattern. Hole locations are determined by stop gages which, after being set are bolted to the machine bed. This allows any progression of holes to be punched in one handling of the part.

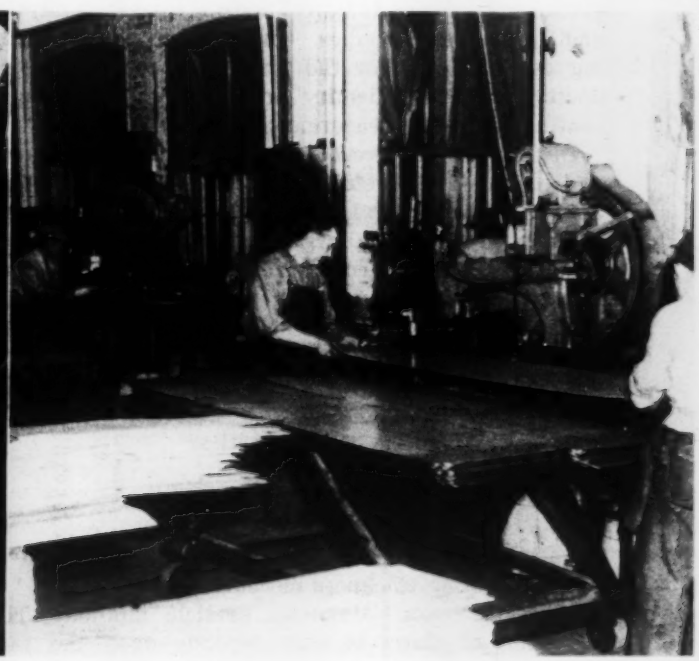
Punch presses used to pierce large diameter holes, blank and form various metal components are of both inclinable and straight-side type. They range from 15 to 75-ton capacity.

Part Variance Negligible—Successful flange bends, correctly welded corners and perfect assembly fits are made possible through accurate punch and die alignment and the use of gages. The simple, compound and progressive dies employed, maintained to hairline sharpness and set up to master patterns, produce thousands of parts with negligible variance.

Step gages, locating from predetermined points, simplify such operations as corner notching or slotting in one operation. High-volume production is obtained with progressive die setups with the aid of roll feeds or other automatic feeding mechanisms that utilize machines to their fullest capacity.



One of two Dreis & Krump multiple punching machines used at McCray Refrigerator for piercing multiple holes in many refrigerator components



This inclinable punch press is one of eight similar units used by the company to punch large diameter holes in refrigerator parts prior to assembly operations

Are You Overlooking Ferromagnetic

Neglected by most metallurgists, magnetic measurements can be extremely valuable in interpreting metallurgical phenomena. Magnetic analysis holds much promise in nondestructive testing, stress analysis and in structural studies

METALLURGICAL phenomena are generally studied by following changes in mechanical properties such as hardness, tensile strength, and elongation; by changes in physical properties such as electrical resistivity, thermal expansion, and thermoelectric electromotive force; by thermal analysis such as heat evolution and heat absorption and specific heat measurements; by macro- and microscopic examination; and by x-ray and electron diffraction.

One physical method of possible greater exploitation, but neglected because of its general unfamiliarity to metallurgists, is magnetic analysis.

Magnetic analysis involves the use of magnetic properties, or changes in them, to study metallurgical phenomena. The method may not be a general procedure for following all metallurgical changes but in its proper relation to other tests it offers an excellent primary or supplementary means of obtaining information.

Perhaps the greatest use of magnetic measurements can be obtained in the examination of ferromagnetic materials. Magnetic analysis holds much promise in nondestructive testing, stress analysis, and in structural studies. Under nondestructive testing one can consider the magnetic particle and induction methods, identity or comparison tests, and coating thickness measurements.

Discussions of stress analysis cover stress gages and methods of determining internal stress. Examples of structural studies which are very important to the metallurgist cover equilibrium diagrams, retained austenite, the isothermal transformation of austenite, tempering, recovery and recrystallization, decomposition of solid solutions, etc.

Nondestructive Testing—Under the heading of nondestructive testing one can consider:

1) Flaw detection
   a) Magnetic particle method
   b) Induction method
2) Identity tests
   a) Cyclograph
   b) Actual measurement
3) Coating thickness measurements

Flaw Detection—Magnetic particle method: The detection of flaws in iron depends upon the fact that lines of induction pass more readily through the ferromagnetic material than through air. Flaws such as cracks, holes and large inclusions cause a leakage of the magnetic flux in the neighborhood of the flaw. If the flaw is at the surface or very near to it, detection of the imperfection is possible. Cracks and imperfections in ferromagnetic materials can be made visible by magnetizing the object and applying a magnetic powder to the work; the powder, of course, clings to the defect.

Fig. 1A shows schematically the distortion of flux lines in the neighborhood of a crack. When powder is sprayed on the material magnetized longitudinally, the powder clings to the region of the crack where there is leakage flux. A subsurface crack is detected in the same way, Fig. 1B.

These powder methods are very effective in locating cracks on or in weldments and also for picking out flakes on forgings.

The material to be tested can be magnetized in two ways. In one it can become part of a magnetic circuit, and in the other a large current of the order of 1500-3000 amperes is passed through the steel, generally for a fraction of a second, and then one relies on the residual induction to make the test.

Induction Methods—Deep seated flaws or other inhomogeneities in ferrous products can be determined by induction methods. The principle depends upon the distortion of the magnetic field outside a body resulting from differences in the permeability of iron.

Fig. 2 indicates principle of the method. Any defects such as cracks, holes, large inclusions, chemical or metallographic heterogeneity causes variations in the permeability of the bar and this affects the induced voltage in the secondary circuit.

The principle of the test can be used to construct a stress measuring device. In such case two identical materials are used but one is stressed whereas the other is not. In a state of stress a voltage difference exists and current flows in the circuit. The current can be calibrated as a function of the load.

Identity Tests—For identity tests, a standard specimen and an unknown specimen are magnetized and some property is compared. Example: A properly carburized cylinder is used as a standard, and production-line cylinders are compared with the standard to see if processing is proper.

A device called the cyclograph compares a standard specimen with an unknown in an alternating field, and the identity or differences are indicated on the oscilloscope by variations due to core loss (a combination of hysteresis and eddy-current losses). This cyclograph can also be used for stress analysis.

For certain physical tests it is often necessary to be certain that the material is uniform in structure,

Analysis?

By J. K. STANLEY
Westinghouse Research Laboratories
East Pittsburgh, Pa.

and that it is stress-free. For such work it is desirable to measure the permeability, coercive force or some other structure-sensitive property. Specimens deviating too severely from a mean are disregarded. For example, in research work it is sometimes expedient to measure the permeability of ferritic stainless steel specimens to see if they are similar before proceeding with expensive and time-consuming creep testing. Nonuniform specimens obviously are discarded.

Coating Thickness Measurements—Many magnetic tests have been devised for measuring ferromagnetic or nonmagnetic coating thicknesses. The principle is one that depends upon the force required to detach a permanent magnet from a ferromagnetic layer on a nonmagnetic base or a nonmagnetic layer on a ferromagnetic base. The two methods are shown schematically in Fig. 3. Films of thicknesses from 0.00002 to 0.001-inch can be determined to within 10 per cent.

For measuring nonmagnetic coatings on ferrous products like Zn, Cu, Sn, paint, or enamel on steel calibration curves can be made so that it is also possible to estimate the thickness of the coating to within 10 per cent.

Stress Analysis—Stress analysis is readily accomplished by magnetic methods since many of the properties are affected by stress, for example, the initial, maximum permeabilities, remanence, and coercive force change significantly with the application of loads.

Stress Gage (Elastic Stresses)—The stress gage which depends upon the variation of permeability with stress is similar to the comparative test mentioned where an unknown rod is compared with a standard rod and variations in induction are balanced out if the rods are identical but show a voltage change if they are not.

The stress gage can be calibrated for tension, compression and torsion. In practice the indicating device is a milliameter which is satisfactory for slowly varying stresses. For vibrational and rapidly alternating stresses a cathode ray oscilloscope can be used. Measurements of internal stresses in deformed nickel using variations in remanence and inital susceptibility, also have been made.

Cyclograph—The cyclograph is a commercial instrument which is essentially an oscillator whose operating frequency and output are governed by characteristics of a test coil in the oscillator circuit. It can give unusual information about mechanical tests.

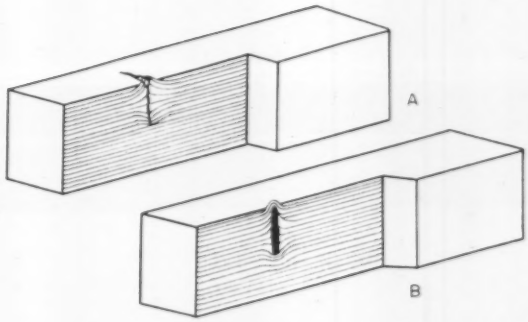


Fig. 1—Leakage flux due to flaws in ferromagnetic materials. (A) Surface crack or flaw, (B) subsurface crack or flaw. Lines represent the distribution of flux in the material and air

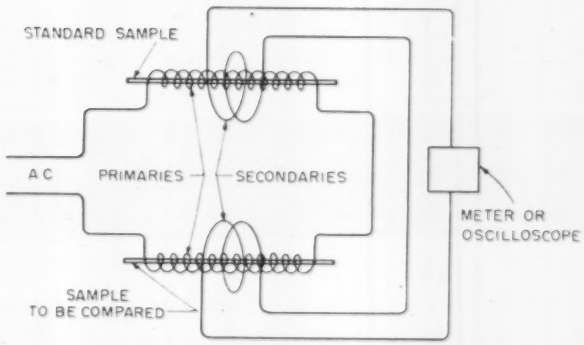


Fig. 2—Induction method of magnetic testing

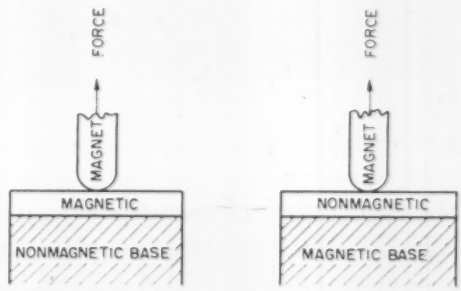


Fig. 3—Schematic representation of two methods of determining thickness of coatings

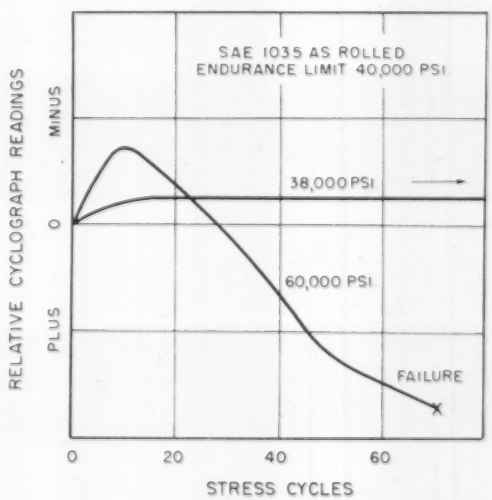


Fig. 4—Cyclograph reading vs. stress cycles above and below the endurance limit recorded during testing on an Avery rotating beam machine

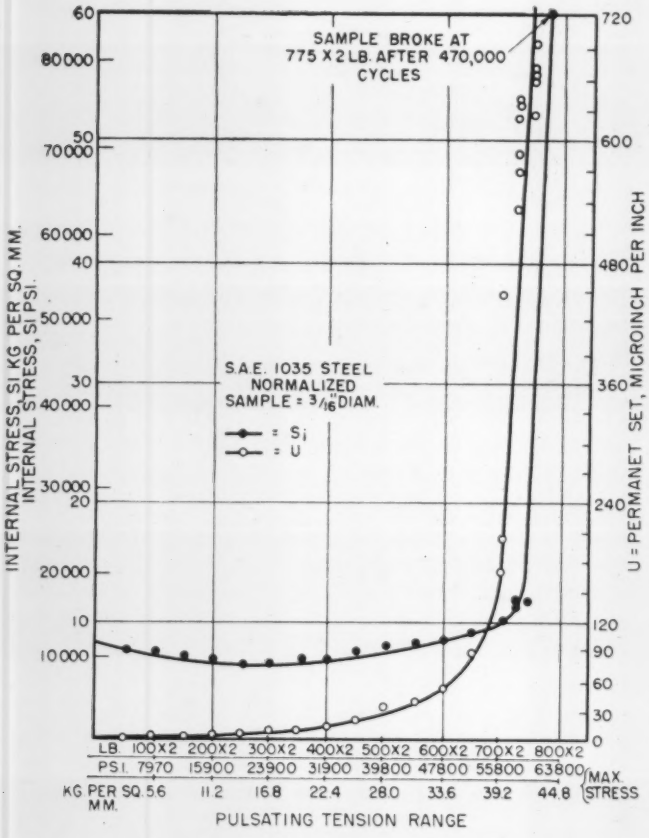

SAMPLE BROKE AT
775 X 2 LB. AFTER 470,000
CYCLES
S.A.E. 1035 STEEL
NORMALIZED
SAMPLE = 3/16 DIAM.
= Si
= U
INTERNAL STRESS, SI KG PER SQ. MM.
INTERNAL STRESS, SI PSI.
U = PERMANET SET, MICROINCH PER INCH
LB. 100X2 200X2 300X2 400X2 500X2 600X2 700X2 800X2
PSI. 7970 15900 23900 31900 39800 47800 55800 63800
KG PER SQ. MM. 5.6 11.2 16.8 22.4 28.0 33.6 39.2 44.8
MAX. STRESS
PULSATING TENSION RANGE

Fig. 5—Variation of internal stress with alternate stressing as measured by Dyna-Magnetic test

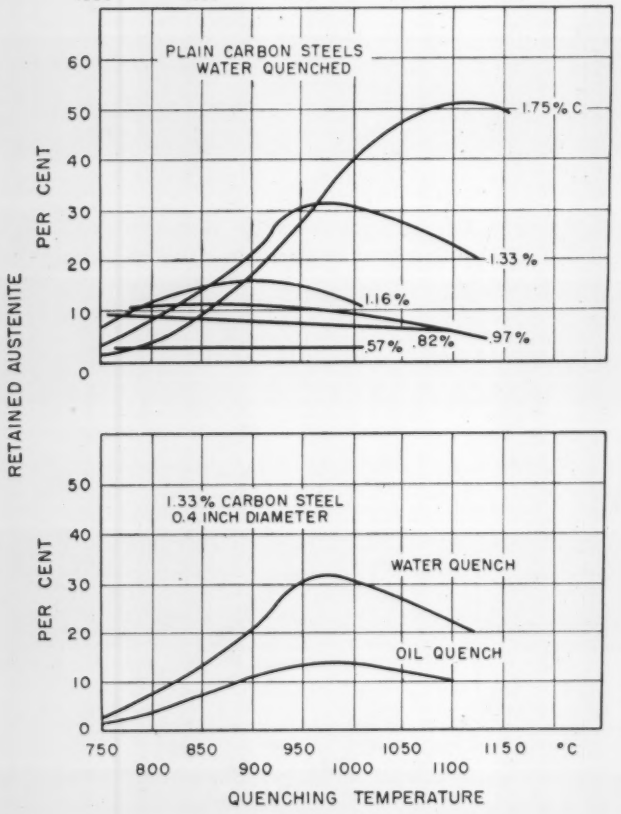


Fig. 6—Retained austenite in carbon steels determined by magnetic methods

The endurance or fatigue test is a good example. At a load above the endurance limit, the internal stresses exceed a critical value and then decrease continuously until failure occurs; this is indicated in Fig. 4. The continuous change in cyclograph readings indicates long before a visible crack appears that the test piece will eventually fail in fatigue.

Dyna-Magnetic Test—The magnetization of ferrous material in an external field, causes a movement of the magnetic domains into the direction of the field and hence there is a change in the induction in the material. Application of an external mechanical stress can also cause a realignment of the domains. Therefore a mechanical stress if of a periodic nature will cause a change in magnetic flux in specimen.

Consequently, if a test coil is placed around the work undergoing periodic stressing an emf is generated. This change in voltage in the test coil generated by a small fluctuating load can be employed to measure the internal stresses, in a ferromagnetic material. This correlation is based on changes in the small remanent magnetism, I_r, obtained in very weak fields.

Fig. 5 shows the internal stress, as measured by the Dyna-Magnetic test in a SAE 1035 normalized steel when tested in a pulsating (Sonntag) fatigue machine. The permanent set occurring during the test is also recorded.

Structural Studies—Many metallurgical topics can be successfully pursued by magnetic analysis. A partial list is as follows: Equilibrium diagrams, retained austenite, ferrite in austenite, isothermal transformation of austenite, tempering of carbon steels, preferred orientation, recovery and recrystallization, decomposition of solid solutions, carbon determination and diffusion.

Equilibrium Diagrams—The determination of equilibrium diagrams where at least one component is ferromagnetic, depends upon the fact that ferromagnetic phases possess a characteristic magnetic saturation intensity, I_s, and Curie temperature, θ. These two structure-insensitive properties are dependent only on the composition. The iron-nickel system to about 50 per cent has been studied extensively by the magnetic method.

Similar analyses have been carried out on the

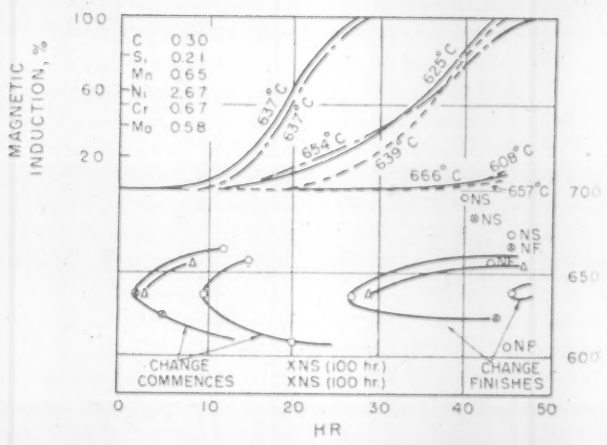


Fig. 7—Isothermal transformation of alloy steel in the pearlite range

iron-silicon system. The decomposition of Fe0 has been studied by such method.

Retained Austenite—Under certain conditions of heat treatment, austenite can be retained at room temperature, and for many purposes this is undesirable. Consequently various methods have been developed to determine the amount of austenite retained.

Since austenite is not ferromagnetic (paramagnetic), it is relatively simple to determine the austenite in a ferritic (ferromagnetic) matrix. One merely has to measure the magnetic saturation of the material in question before and after heat treatment.

From the work of Esser and Ostermann[1], Fig. 6, one sees how much austenite is retained in plain carbon steels when they are quenched in water from different temperatures. Upper curves show the effect of water quenching on a series of carbon steels containing 0.57 to 1.75 per cent carbon; the lower diagram shows that a water quench retains more austenite than an oil quench.

The magnetic method has been used in studying austenite decomposition and martensite tempering by many workers.

Ferrite in Austenite—The occurrence of ferrite in austenitic steels is often undersirable and simple methods have been devised to detect the ferrite phase. One of the simplest methods is to place colloidal iron oxide on a polished sample of austenitic steel in the presence of a magnetic field. The magnetic particles are deposited on the ferritic areas.

Isothermal Austenite Decomposition — Up to the time (1930) of the publication of the classic paper on austenite decomposition by Davenport and Bain[2], the commonest method of studying phase changes in steels was the thermal methd*. The method still finds usefulness in certain studies but for complex alloys it is very difficult to interpret the curves without some previous knowledge of the thermal behavior of the alloys. The dilation method is quite satisfactory for studying austenite decomposition but the equipment requires continuous supervision.

A magnetic method has been devised by Russell and Mavrocordatos[3] which is continuously self-recording. Since the decomposition of austenite is generally accompanied by a change in magnetic induction, it was decided to follow changes in this property. The method is particularly useful for steels showing a sluggish transformation.

The results of the magnetic method of following the austenite transformation in a Ni-Cr-Mo are given in Fig. 7. The full, dashed, and dot-dashed lines are for three specimens.

The various isothermal transformation curves as derived from the magnetic induction-time curves at 637 and 639 or at 654 and 657° C show reaction rates differing markedly from each other; these variations are probably caused by dissimilarities in nucleating factors. The points NS and NF show the temperature and the time of the tests; they indicate that the transformation had not started or had not finished at the end of the time shown; points marked NS (100 hours) show temperature at which tests were made.

Tempering of Carbon Steels—The magnetic analysis method is used quite successfully in the study of carbon steels. The tempering of plain carbon steels is often considered to be a relatively simple process compared to precipitation of constituents in nonferrous systems, for example in the Al-Cu alloys. The work of Antia, Fletcher and Cohen, however, indicates that tempering is a more complicated process than ordinarily supposed.

They used a magnetic method of study together with dilation, volume, hardness and x-ray diffraction measurements, and metallographic examination. With all these guns trained on the problem, some interesting results were obtained.

It was shown that the tempering of high carbon steels, after the austenite has been quenched to get a mixture of retained austenite and martensite, occurs in three stages:

First stage: The tetragonal martensite decomposes into ferrite and a transition phase. This transition phase has a lower intensity of magnetization, I_s than iron, so that it cannot be ferrite. It cannot be Fe_3C because it does not show the Fe_3C Curie point

*Transformation temperatures are obtained from inverse-rate curves plotted from time-temperature data; in these curves the temperature of the specimen is plotted against $\Delta t/\Delta T$ where t and T are time and temperature, respectively.

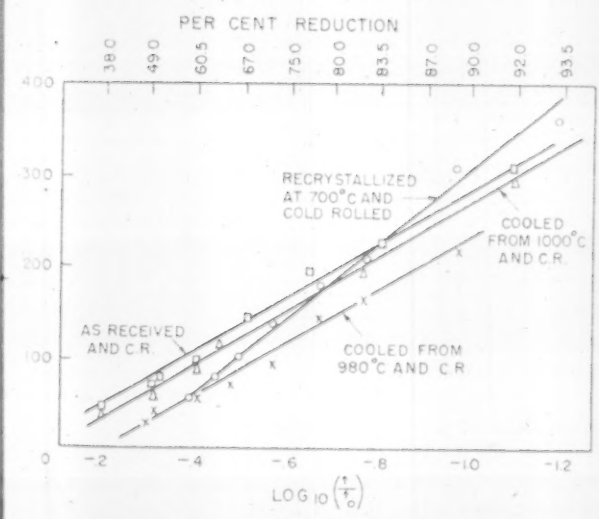


Fig. 8—Change in cold rolled orientation with reduction in a low carbon steel

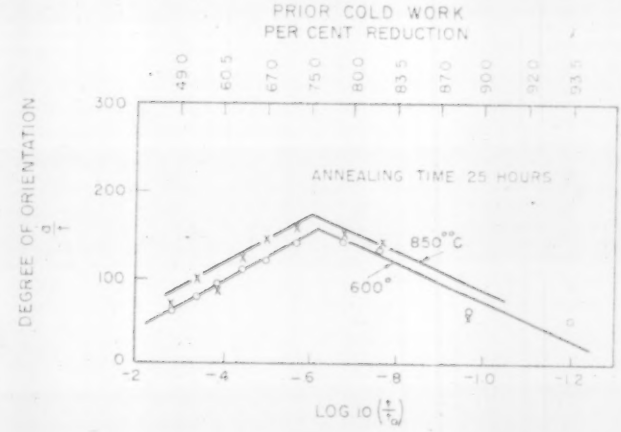


Fig. 9—Change in orientation of cold worked low carbon steel on recrystallization

Second Stage: The retained austenite decomposes into an unidentified mixture, at least in the initial period of decomposition, which cannot be ferrite and cementite because of the lower I_s and lack of a Fe_3C Curie temperature

Third Stage: The Fe_3C forms and its characteristic Curie point is obtained. There is a rapid drop in the intensity of magnetization of the transition phase.

The Fe_3C grows out of the austenitic and martensitic products.

Preferred Orientation—In polycrystalline materials such as low-carbon sheet steel and the iron-rich alalloys such as Fe-Si, it is possible, by rolling and proper heat treatment, to develop a high degree of preferred orientation which results in an anisotropy of mechanical and magnetic properties. The orientation in some cases may even approach that of single crystals.

It is well known that single crystals of ferromagnetic materials have directions of easy and difficult magnetization. In polycrystalline materials, under certain conditions, it is possible to get the individual crystals to align themselves in such manner as to obtain preferred orientations in which case it is also possible to have easy and difficult directions of magnetization.

If a disk of a single crystal or an oriented polycrystalline material is mounted in a strong magnetic field, the field will tend to rotate the disk so as to bring the easy directions of magnetization into the direction of the field. This rotation of the disk to certain positions is due to a torque about the specimen axis perpendicular to the plane of the disk.

Torque Diagrams Used—Torque diagrams can be used to study the degree of orientation in steels and electrical sheet. In the polycrystalline specimens an arbitrary index of the orientation can be obtained by measuring the maximum amplitude of the torque curve and dividing it by the thickness; this is the a/t ratio used in the following figures.

Typical information obtained in the development of a cold rolling orientation in low-carbon steels, previously treated in various ways before cold rolling, is shown in Fig. 8. The cold rolling orientation developed in low-carbon steel can be described as consisting essentially of (100)[110], i.e. the (100) plane is in the rolling plane and the [110] direction is in the rolling direction. In Fig. 9 the orientation index a/t for the orientation just described is plotted against the $\log_{10} t/t_o$ where t_o is the initial and t the final thickness. Note that preferred orientation does not set in until about 40 per cent cold work.

Recrystallization does not result in the destruction of preferred orientations produced by cold rolling. Recrystallization textures in the case of iron are quite different from the cold rolling ones but they can also be readily analyzed. The orientation developed in recrystallizing the low-carbon steel mentioned above can be described as the (110) [100]. Fig. 9 shows the variation of orientation in the recrystallized low-carbon steel as a function of prior cold work. Note that there is a maximum orientation developed at about 75 per cent; this effect has never been explained.

Use of magnetic methods to follow recrystallization and grain growth should be usually successful. Unfortunately very little has been done along these lines. One would expect pronounced changes in permeabilities (increase) and hysteresis loss (decrease) when a ferromagnetic material recrystallizes so that the change should be very easy to study. Furthermore, it is known that permeabilities increase and hysteresis loss decreases as grains grow larger. Work along these lines is in progress and the possibilities of the magnetic method can be better evaluated when this work is completed.

Decomposition of Solid Solutions—The precipitation of beryllium from a nickel alloy containing 2 per cent Be has been studied. During the precipitation, it was found that the solid solution decomposed into Be and a Be-poor solid solution with an increase in mechanical hardness, the saturation induction, the saturating field, the remanence, the coercive force and Curie temperature.

Other studies on the Ni-Be alloys, using the magnetic properties to follow the metallurgical changes, show that the supersaturated solid solution of Ni-Be decomposes by two simultaneous processes: A homogeneous and a heterogeneous precipitation. Depending on the annealing temperature and the degree of supersaturation of the solid solution, either process can predominate over the other.

Carbon Determination—Since carbon is known to have a very large effect on the magnetic properties of iron, it is only logical that some efforts should be directed toward the rapid detection of carbon in iron and steel by magnetic tests. Important and useful relations between carbon and permeability have been derived.

Diffusion — The magnetic method of study has been applied, to the detection of diffusion in the Cu-Ni system using powder metallurgy techniques. The rate of approach to homogeneity, and the degree of heterogeneity were readily followed by studying the change in slope of the magnetization vs. temperature curves as sintering proceeded.

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3. T. F. Russell and C. Mavrocordatos, Experiences in the Study o Isothermal Transformations, Jnl. Iron & Steel Institute, 1939, 16 33-43.

Rubber Stamping by Machine

". . . .And mark with ink, from rubber type". This specification on many contracts has meant a time-consuming and costly operation. In an effort to eliminate these bugaboos and better serve fabricators of component parts and small assemblies, Bell Press, Los Angeles, developed a method of part and piece marking by machine.

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After stamping is performed on a special press the parts are sprayed with specified lacquers. Company reports that it has encountered no limitations as to size, shape, surface, weight, placement or degree of curve of either part or marking.

Overwork makes these lugs Stronger...

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WHEN Ilsco Copper Tube & Products, Inc., Cincinnati, Ohio, first designed their new type electrical wire connectors, they insisted that the product requirements, which were rigid to begin with, not only be met, but exceeded.

These requirements included mechanical strength, adequate electrical conductivity and uniformity, plus ease of application and long life with no season cracking. So it wasn't easy to find a material that would fill the bill. Because of favorable past experience, Ilsco tried a certain type of Revere Seamless Copper Tube. They gave it the complete cold-working treatment: forming, sawing, drawing, shaping, separating, expanding, tapping, reducing, and piercing. They not only came up with a connector without distortion, but one that, because of its one-piece seamless construction, had the additional strength necessary to withstand Underwriter's Laboratories tests for secureness and the hard usage and abuse the connectors would receive in the field.

The use of Revere Seamless Copper Tube resulted in finished connectors with a smooth, even, bright finish . . . no pitting . . . produced connectors that average over 50% cooler in operation than the maximum allowed by Underwriter's Laboratories.

Perhaps Revere can be of help in improving or developing your product . . . cutting your production costs. Why not tell Revere about your metal problems? Call the Revere Sales Office nearest you today.

SHOWN ABOVE are a few of the various styles and sizes of ILSCO Connectors. All are drawn and formed from Revere Seamless Copper Tube. They have 100% electrical conductivity, permitting a more compact unit, with a wide wire range for each size. However, only 6 sizes provide for the entire wire range from # 6 to 600 MCM.

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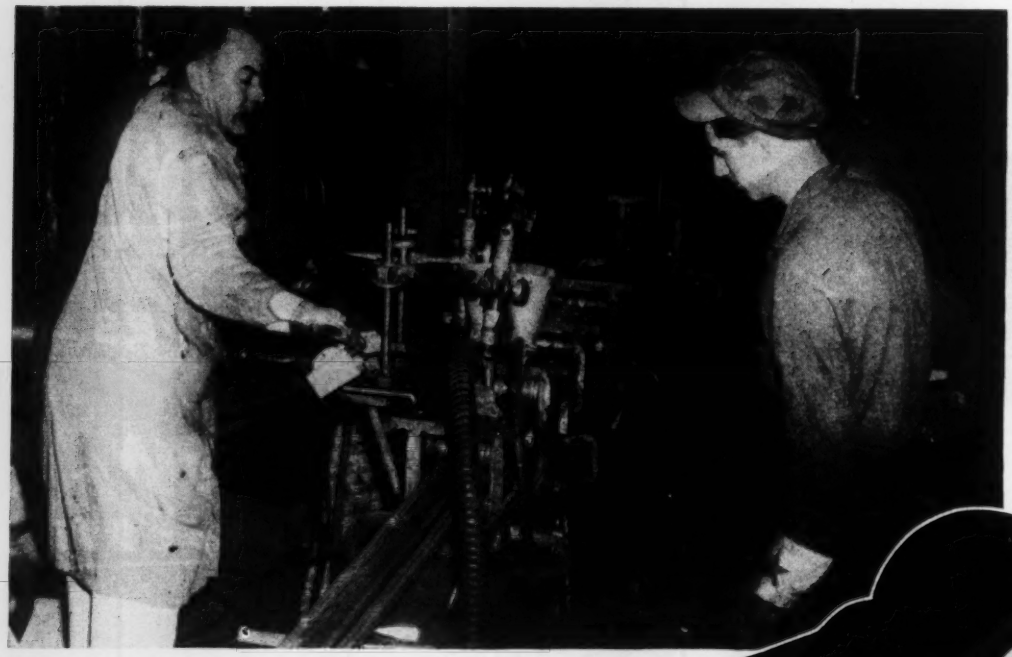


Left — Temporary setup for hidden arc welding a lot of 76 superheater tubes. Guns of the two welding units are clamped stationary while tubes are passed under at the rate of 22 inches per minute

Below—Cross section of sample welded on test setup. Samples were run in mild steel to test setup. No cracking was encountered in any of the welds

Temporary Welding Setup Solves Small Lot Problems

Using available hidden arc welding equipment, one company welded seventy-six 4-6, chrome superheater tubes, at a profit, without tying up a lot of capital in the operation

By NELSON MARTIN
Welding Technician
Foster Wheeler Corp.
Dansville, N. Y.

METHOD recently devised for welding 4-6 chromium steel superheater tubes answered a tough welding problem and satisfied the economic limitations of a small lot production run at Foster Wheeler Corp.

The problem was to weld two bars, $\frac{5}{8}$ x $1\frac{1}{4}$-inch x 30 feet, to 30-foot long, 2-inch diameter, $\frac{1}{4}$-inch wall, superheater tubes. The bars were added to increase the rate of heat transfer. For most efficient heat transfer through the bars, continuous welds of 100 per cent penetration were specified. The entire job called for only 76 tubes.

Temporary Setup Devised—A larger production run would have justified the installation of a fully automatic welding unit. For this job, however, a temporary setup was devised, using available equipment. Two manual Lincolnweld machines were used for the welding. These units have a good deal of flexibility in that they can be used for regular open arc welding, manual hidden arc welding, or semiautomatic mechanized hidden arc welding. They fitted this type of application since the units do not tie a large capital outlay to one welding operation.

The two welding guns of the two manual hidden arc units were held stationary, clamped in an adjustable cutting torch fixture. The tube assembly with the two bars tack welded was fed through drive rolls and passed under the welding guns at a constant speed of 22 inches per minute.

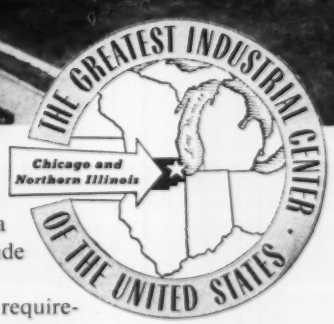
Before reaching the welding guns, the tubes passed through six turns of copper tubing connected to a high-frequency heater. Here the tube was preheated to a temperature of 500° F.

Welds Made Simultaneously — The two welding guns made two continuous welds simultaneously, using 400 amp at approximately 32 v. A 4-6 chrome wire drawn down to a diameter of 5/64-inch was fed automatically through the welding guns which were depositing the granular welding flux around the arc. No edge preparation was required but considerable care was taken in securing good fit through the jigging in order to avoid burning through the $\frac{1}{4}$-inch tube wall. One pass was made on each side.

A vacuum pick-up nozzle was mounted next to the welding guns to pick up the loose flux as the tube passed under it.

No Cracking Encountered—The hidden arc welding process offers several advantages for this type of welding application on 4-6 chrome. The high current density on the small 5/64-inch wire results in a high heat concentration, which is further concentrated by the covering of flux. Making the 30-foot weld without stopping also provides a uniform rate of heat input and permits better control of preheating. No cracking was encountered in the welds.

Following welding, the tubes were put in a furnace and brought from 600° F to 1325° F at the rate of 100° F per hour. This temperature was held for 8 hours. Tubes were then cooled 100° per hour until they were back down to 600° F. They were then allowed to furnace cool to room temperature.



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The accuracy of one-half of one scale division on the dial indicator is well within the limits specified for fine instruments. Sensitivity is controllable by the selection of any one of twelve different dial calibrations, with ranges of 1, 2, 5, 10 and 20 pounds; 16, 32, 80 and 160 ounces; 500, 1000 and 5000 grams.

Interchangeable Fittings Provided—Flexibility and simplicity of the indicator is accomplished by providing six interchangeable force-transmission fittings, for measuring either push or pull. Whenever simple cords or tapes are used in conjunction with the hook, tangential forces are easily measured.

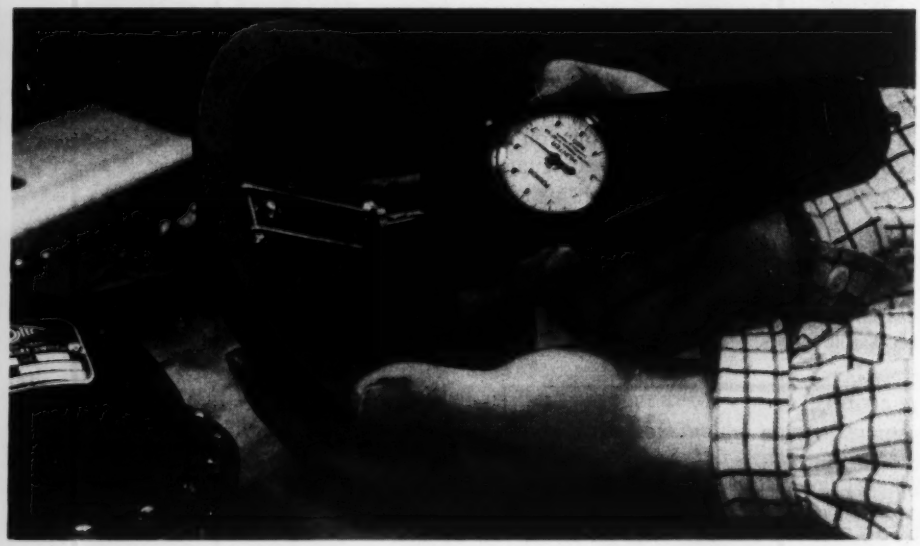
Uses Compensated Spring System—The device uses a compensated spring system to measure the force, and a dial indicator to register it. The compensated spring design permits a gradient (ratio of force to deflection) which remains constant to an accuracy as high as 99.9 per cent over full dial range. This means that errors resulting from gradient variation are virtually eliminated. Further, the design prevents operation in the curvilinear extremities of the force deflection curve of the spring system.

The compensating spring preloads the main spring so that the first part of the curve is never a factor in actual use, and the latter part is avoided by physically limiting the deflection of the spring to only the linear portion of the curve. Finally, to improve accuracy and increase sensitivity, the bearings for the force transmission rod are flat centering springs without friction.

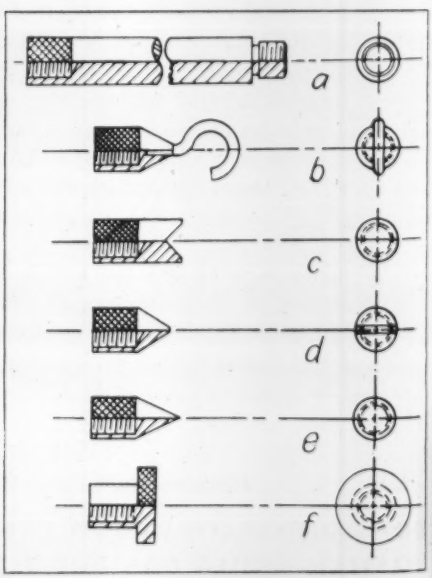
Many Production Line Uses—Industrial laboratories have used the force indicator to determine (1) torque developed by a pony brake, (2) force required for brake bands to operate, (3) axial force necessary to engage a rotating clutch and (4) minimum force required to overcome static friction. The effort expended to operate such devices as direction signal lights, horn buttons, plunger-and-switch assemblies for glove compartment doors, and starters are likewise easily detected with the simple thrust-bottom attachment—all of these uses reported by a single major automobile manufacturer.

An electrical laboratory is using the device (1 pound maximum calibration) to measure contact point opening pressure of a voltage regulator.

The production line, too, suggests many uses for the device to make sure that design tolerances are held. Perhaps the most general application is found in the final adjustment of spring actuated devices before shipment. In photo the operator is shown adjusting the switch setting in a differential-pressure switch.



Left—Force indicator speeds pressure setting of a precision electric switch



Right—These six interchangeable force-transmission fittings are used for measuring either push or pull. From top to bottom they are: 6-inch extension to the main rod for reaching inside almost any mechanism; pulling hook; V-notch thrust fitting for lateral rod pressure; chisel fitting to bear in re-entrant edges; conical point force applicator; simple thrust button

Announcing

NEW HINGED STEEL BELTING DESIGNED FOR HANDLING...

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FLASH
HOT FORGINGS
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(WET OR DRY)

To your specifications from stock!

● For the FIRST time . . . You can incorporate a conveyor belting in the mechanized handling of hot and heavy forgings, stampings, flash and turnings as well as scrap steel and wet or dry chips.

● Features of this new MAY-FRAN hinged-steel belt guarantee a durable conveyor surface constructed to withstand production punishment. The precision-formed heavy-gauge hinged-steel links are assembled by means of high-carbon steel rods with side chains becoming an integral part of the belt. Interlocking side wings on the outside links are designed to provide positive engagement even when traveling around sprockets. Link and rod construction eliminate fall-through.

● MAY-FRAN hinged-steel conveyor belting can be assembled from stocked component parts to provide units of practically any width or length to meet individual requirements. Belting is available in 2½, 4, 6 and 12-inch pitch lengths.

● MAY-FRAN engineers are equipped to design and construct complete conveyor systems to meet the production needs of industry.

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1725 CLARKSTONE RD., CLEVELAND 12, O.

Mill Roll Blasting Reduces Operating Costs

Faster, more efficient mechanical processing methods incorporated in special American Wheelabrator machines reduce costs of etching roll work faces to 59 cents per roll

By GILBERT D. DILL
Steel Mill Sales
American Wheelabrator & Equipment Corp.
Mishawaka, Ind.

ART of etching or roughening the working surface of mill rolls was instituted about 1928 as a means of providing a new type of sheet finish designated as a dull finish. This finish was developed to overcome certain objections, particularly on sheets to be coated, to the standard bright smooth surface.

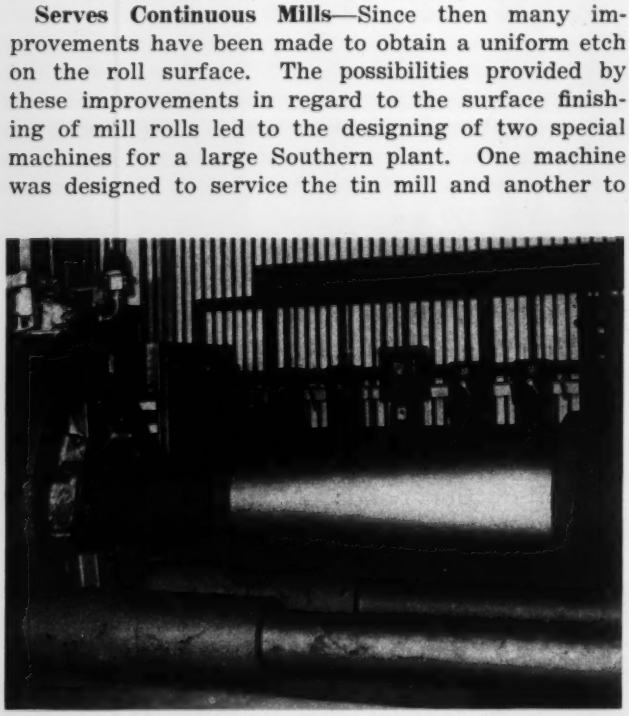
Today, rolls roughened to varying degrees of etch are used in temper mills to impart special surface treatments required by certain cold rolled products, such as tin plate. They are also used to prevent slippage in cold rolling and to provide special surfaces for deep cold drawing operations; galvanizing; vitreous enameling; painting; etc.

A new airless method of blasting introduced about 1933 greatly reduced operating costs and materially increased production. This method of blasting was achieved by the use of a specially designed eight-bladed wheel known as a Wheelabrator. The wheel turned at 2250 rpm and by special control of the abrasive flow, delivered about 400 pounds of metallic abrasive per minute over a blast pattern about 30 inches long and 3 inches wide when the work being blasted was 24 inches from the rim of the wheel.

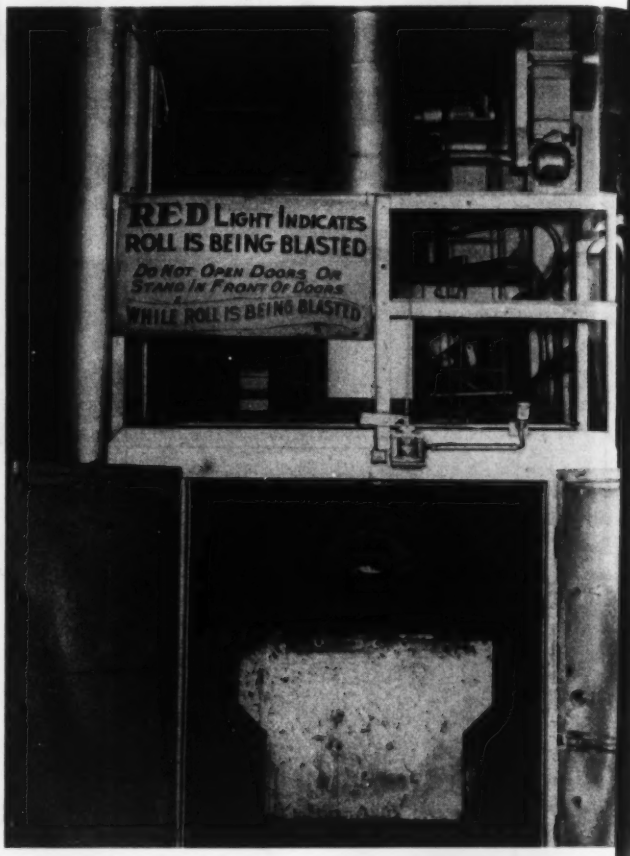
Serves Continuous Mills—Since then many improvements have been made to obtain a uniform etch on the roll surface. The possibilities provided by these improvements in regard to the surface finishing of mill rolls led to the designing of two special machines for a large Southern plant. One machine was designed to service the tin mill and another to service the sheet mill. The tin mill unit is heavily constructed and completely automatic in its operation. It handles rolls 15 to 20½ inches diameter with a 42 to 54-inch working face and an overall length of 9 to 12 feet. Provision also is made to obtain a coarse, medium and fine finish on the rolls by the use of three sizes of chilled iron grit abrasive and by automatic control of the roll movement under treatment. The present operation calls for these finishes in accordance with the following schedule:

1. Cold reduced sheet stock, use G-25 grit blasted rolls.
2. Tempered strip for hot dip tin plate, use G-40 grit blast rolls.
3. Tempered strip for electrolytic tin plate, use G-50 grit blasted rolls.
4. For fine grained finishes, use G-80 and G-120 grit blasted rolls.

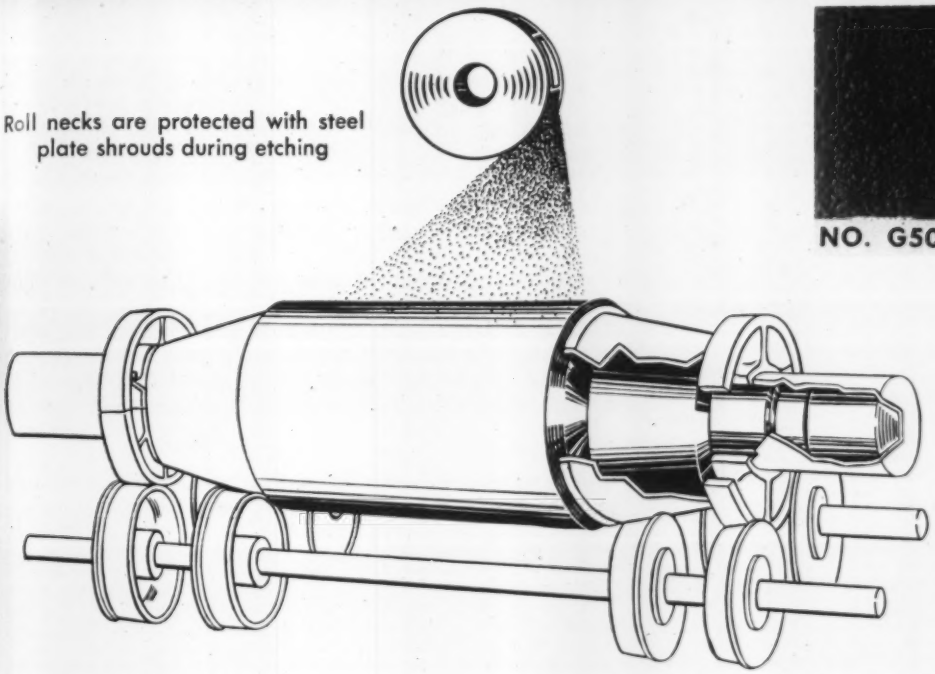
The tin mill unit includes a heavy steel cabinet 25 x 5½ x 6 feet 5 inches above the floor equipped with double doors at one end for admittance of the work car. The inside of the cabinet is lined with wear plates which can easily be replaced. Directly beneath the cabinet are gravity hoppers arranged to discharge the spent abrasive into right and left hand screw conveyors which move the abrasive to a cen-



Blast-etched roll leaving blast cabinet



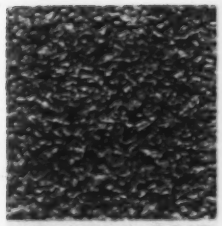
Interior of blast cabinet. When doors are closed the roll rotates through the blast



Roll necks are protected with steel plate shrouds during etching

NO. G50 GRIT

NO. G40 GRIT



NO. G25 GRIT

Typical finishes on roll surfaces imparted by blasting 9 square feet per minute. X5

tral point where it is discharged into a rubber belt steel bucket type elevator.

Abrasive Is Airwashed—Spent abrasive is elevated from the bottom of the machine to the abrasive separator whose function is to airwash the abrasive as it circulates and remove undersized abrasive made through breakdown, caused by the high velocity impingement of the blast against the roll. The unit is adjustable so that the size of material removed can be controlled with reference to the size of abrasive in use. The removed material is discharged to an abrasive classifier for screening and storage.

The most important part of the machine is the Wheelabrator unit. It is a standard 19½ x 2½-inch wheel, driven by a 25 hp motor at a speed of 2250 rpm. It is equipped with eight alloy steel blades which throw a maximum of 400 pounds of abrasive per minute to secure a blast pattern 30 inches long and 3 inches wide.

The unit is arranged so that the length of the blast pattern is on the longitudinal centerline of the roll. The abrasive from the separator storage hopper is fed to the wheel by gravity. Volume of flow is adjustably controlled by a sliding damper type valve, and the flow rate is controlled by air undercutting bucket type valve, operated by an air cylinder which is actuated through an electric solenoid operated air valve. This flow control can be manually started and automatically stopped to complete the blasting cycle.

Spent Abrasive Classified—Another feature of this machine is the abrasive classifier. In blasting rolls, the abrasive in use is constantly broken down into finer particles and since various degrees of roll etch are desired, it is important to reclaim all usable abrasive from the separator discharge.

To perform this function, there is provided a multiple deck, totally enclosed Shaler shaker-type screen unit. It is located along side of the cabinet and directly under the separator. Gravity feed spouts feed the abrasive from the refuse side of the separator and also from the storage side when the abrasive is changed in the machine to secure a different roll finish. Forming a part of the classifier and located at floor level and below the unit, are storage hoppers equipped with manually-controlled valved gravity feed spouts which discharge into the hoppers under the cabinet. This arrangement makes it possible to quickly charge the machine with the desired abrasive dictated by the roll finish required after all previous abrasive has been removed and classified.

The work car whose function is to spin and move the roll under the wheel blast, is equipped with dc variable-speed drives. All parts are adequately protected from the blast. The car is 16 feet 1½ inches long and 4 feet wide and is mounted on roller bearing, flanged car wheels.

Shrouds Protect Surface—In any roll etching process, it is necessary to protect the bearing surfaces on the roll necks and this is usually accomplished by the use of roll neck shrouds and adapter wheels. This equipment is placed on the roll necks before loading the rolls onto the work car and consists of a heavy cast steel wheel with attached steel plate shrouds.

One of the by-products of abrasive blasting is dust or finely divided abrasive and it is necessary to operate the equipment under a negative pressure. The equipment therefore, is provided with vent connections located on the cabinet, elevator, separator and classifier, and connected by sheet metal ducts to a dust collector placed either adjacent to the machine or, as is usually the case, outside the building within a radius of 75 to 100 feet. The unit is a standard cloth bag type filter and is equipped with an exhaust fan operating on the clean air side which provides the necessary suction at the cabinet preventing any leakage of dust. The discharge from the fan may be to the atmosphere or into the building housing the equipment, since 98 to 99 per cent of the dust is removed from the air stream by the collector.

Production of this type roll roughing machine is

OPERATING COST AND COST PER ROLL

Wearables and maintenance, including labor 65c/wheel/hr	$0.65
Abrasive loss, 25 lbs/wheel/hr @ 7c/lb	1.75
Power, 30 kwh @ 1c/kwh	.30
Total machine cost per hour	$2.70
Operating labor:	
One operator, $1.75 per hour	1.75
One laborer, $1.25 per hour	1.25
Total cost of operation per hour	$5.70

Actual production is six rolls per hour.

Production on basis of wheel operating hour is 60 minutes and 2 minutes blasting time = 30 rolls per hour.

Actual cost on basis of constant labor charge and intermittent wheel operation charge is:

Blasting cost—1/5 of $2.70 + 6	$0.09
Labor—$3.00 + 6	0.50
Total cost per roll	$0.59

determined not by the blasting time but by the time consumed in shrouding the roll necks, loading and unloading to and from the work car and the distance of car travel to and from its starting position inside the cabinet. The machine consistently produces 24 rolls per shift with only a two to three-minute blasting time. The balance of the time is consumed in moving the car 30 feet to and from the roll loading station and in handling the rolls and neck shrouds and adapter wheels. This production is adequate for present needs, but by speeding up the car movement and handling time, it could easily be doubled.

Roughening Cycle Increased—As an example, a machine has just been purchased by a large steel mill in the Pittsburgh district to roughen 48 rolls per shift minimum, with built-in features to increase this to a possible 96 rolls per shift. The machine is the same in detail as that just described except that the work car has a faster travel speed to and from the roll loading station which is located closer to the machine; the roll neck shrouds and adapters are redesigned for faster installation and greater variation in the roll spinner drive built in, all of which provides a complete roughening cycle as follows:

	Minutes
1. Fitting roll with shrouds and adapter wheels	2
2. Loading roll on work car and moving car to blasting position inside cabinet	2
3. Blasting time	2
4. Return car to roll loading position and remove roll	2
Total time cycle	8

To increase production at a later date, the cabinet of this machine is equipped with double doors at each end for the future addition of another work car. Under the above time cycle, this will double the production with little increase in cost. The accompanying table shows the operating cost of the machine and cost per roll.

The tin mill operation previously mentioned in this paper has brought out the following improvements:

1. Elimination of the human element since the equipment is automatic in its operation once the necessary adjustments for each type of finish are determined.
2. The equipment has proven reliable from an operating standpoint since the cold mills have not experienced any lost time due to a delay in delivery of roughened rolls.
3. The degree of etch or roughening of the roll surface is easily controlled and accurately reproduced due to the automatic features built into the equipment.
4. Changes of abrasive for different roll finishes are quickly and efficiently made.
5. A uniform depth of etch on the roll surface, as shown in photo, with a definite improvement of the end product is achieved as a result of the Wheelabrator blast pattern.
6. Higher screwdown pressures are used in the rolling mill to secure a flatter strip with a subsequent 50 to 60 per cent reduction in reroll tonnage.
7. The percent of roughened roll changes per ton of strip rolled has been materially reduced, indicating a definite increase in roll life.
8. If desired, the equipment may easily be adapted to the handling and blasting of rolls in pairs.

Cast Steel Dives Deep

The descent of McGinty to the bottom of the sea as told in song probably was without the elaborate equipment used by Otis Barton, a Boston scientist, user of a giant cast-steel diving bell. Known as a benthoscope, the massive steel casting was built to specifications calling for extreme strength and durability and resistance to high under-sea pressures.

Cast-In Muscles—Design of the unusual cast steel shape posed many complex problems for the engineers. After consideration of several manufacturing methods, it was finally decided to cast the bell of an alloy steel having a tensile strength of 90,000 psi and yield point of 70,000 psi.

The heat-treated benthoscope shell and its manhole cover were made by Atlas Steel Casting Co., Buffalo, N. Y. It was cast with 2-inch wall sections, subsequently reduced by machining to a finished section 1¾ inches thick. Weight without equipment installations was 5400 pounds.

Feeling Mighty Low—The machining, mostly inside the ball, and final outfitting were performed by Watson-Stillman Co., Roselle, N. J. More than man-high, the deep-sea diving bell is designed to withstand pressures beyond 3000 pounds per square inch for intended service under the surface of the ocean. It is designed to go to a depth of at least 6000 feet, with theoretical safety factors down to 10,000 feet.

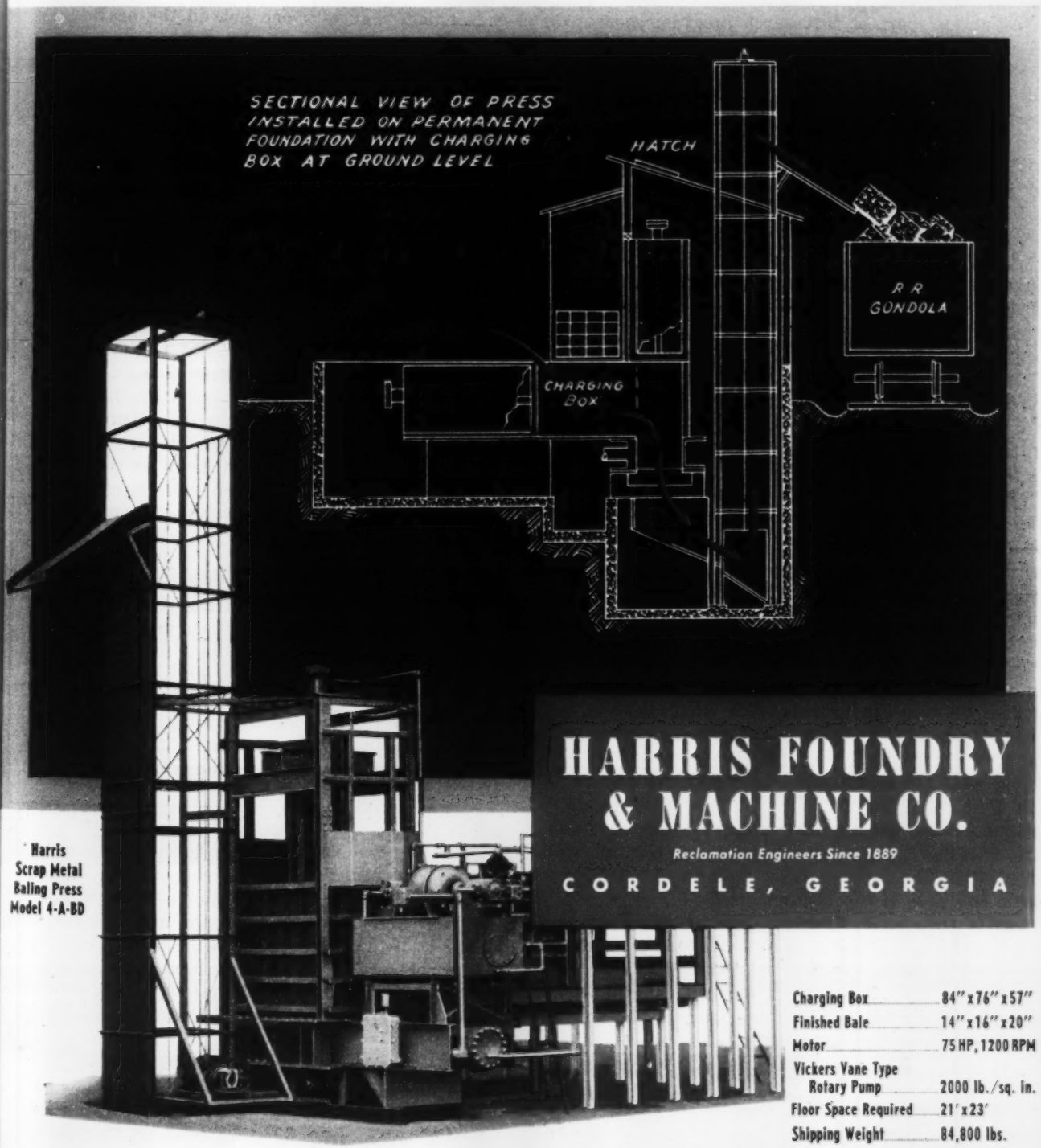
Cost Guide Aids Aluminum Users

A guide for approximating typical costs of applying 20 different treatments for aluminum is included in a 124-page process manual, *Finishes for Aluminum*, published by Reynolds Metals Co., Louisville, Ky. The 1950 edition not only supplies basic information on the various processes for applying surface finishes to the metal, but also details characteristics of finishes so produced.

Included is information on 10 cleaning treatments, 15 mechanical finishes, 16 chemically produced finishes, and 11 electrolytic oxide finishes, plus organic and specialized finishes such as luminous paints and vitreous enamels. Containing 37 illustrations, the book is wire bound to lie flat when open. Among its 18 tables is one which gives typical finishing practices for a wide variety of aluminum products to serve as a suggestion when selecting a finish.

THE NEW HARRIS PRESS
WITH BOTTOM DROP OUT FOR BALES
Faster • Cleaner • More Profitable

The new Harris Press with its revolutionary bottom drop-out design averages 38 to 43 bales an hour (avg. wt. 300 lbs.) That's 6½ tons every sixty minutes! This extra speed means extra profits for you. Our engineers stand ready to advise and help on every installation. Write for full details on this sensational new Harris Press . . . Model 4-A-BD.


SECTIONAL VIEW OF PRESS INSTALLED ON PERMANENT FOUNDATION WITH CHARGING BOX AT GROUND LEVEL
HATCH
R R GONDOLA
CHARGING BOX

Harris Scrap Metal Baling Press Model 4-A-BD

HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA

Charging Box	84" x 76" x 57"
Finished Bale	14" x 16" x 20"
Motor	75 HP, 1200 RPM
Vickers Vane Type Rotary Pump	2000 lb./sq. in.
Floor Space Required	21' x 23'
Shipping Weight	84,800 lbs.

Well-Designed Oil Holes and Grooves Improve Bearing Lubrication

Studies by the National Bureau of Standards reveal that behavior of plain journal bearings is greatly influenced by methods of feeding oil through the bearing shell

COMPARATIVE performance of plain journal bearings with various arrangements of oil holes and grooves, operating in a four-bearing friction machine with forced feed lubrication was recently determined by researchers at the National Bureau of Standards. Much useful knowledge on different methods of bearing lubrication was provided by this investigation, part of a research program sponsored by the National Advisory Committee for Aeronautics.

Method of admitting oil to the bearing constitutes an important design problem. Fundamentally, the concept of the load-carrying film indicates that it is desirable to avoid oil holes or grooves which interfere with the normal development of hydrostatic pressure to support the load.

In some bearing installations, however, it is not always possible to do this. For example, where loads on the bearings are fluctuating in both intensity and direction, it is sometimes impracticable to apply the oil to the unloaded side throughout the complete load cycle. In other cases, provision must be made for a continuous flow of oil to some other moving part.

The bureau's investigation covered five different arrangements for feeding oil through the bearing shell. For all these arrangements each hole or groove was in the axial center of the bearing and was connected to the source of oil supply.

One Oil Hole in Bearing.—With this arrangement, the absence of holes or grooves on the loaded side of the bearing permits normal development of pressure in the oil film. Consequently, the bearing has relatively low friction and low ZN/P* at transition between stable and unstable lubrication. While the single hole does not allow the highest oil flow, it would probably provide adequate heat dissipation for most conditions.

Two Oil Holes in Bearing—The single hole on the loaded side with this arrangement apparently disturbs the normal development of pressure in the oil film, causing a measurable increase in friction and in ZN/P at the transition point. The particular location of the oil hole on the unloaded side is adverse from the standpoint of oil flow; hence the rate of heat dissipation is somewhat lower than the arrangement with one hole in the bearing.

Axial Groove in Bearing—This arrangement apparently provides a slightly better distribution of oil for the development of the load-carrying film than the arrangement with one hole in the bearing. Consequently, the bearing has low friction and lowest critical ZN/P, and the high oil flow provided is advantageous where forced cooling is necessary.

*To obtain characteristic friction data with a minimum of change in bearing surface, tests with each set of bearings were first made in the region of stable lubrication at the higher values of the generalized operating variable, ZN/P. Z is absolute viscosity of lubricant, N is speed of shaft and P is pressure on the projected bearing area.

Four Holes in Bearing—The two holes on the loaded side disturb the development of pressure in the oil film to a greater extent than the arrangement with two holes in the bearing. Critical ZN/P is higher but the friction is comparable. The two holes on the unloaded side are not in advantageous positions. Oil flow and rate of heat dissipation are comparable to the arrangement with one hole in the bearing.

Circumferential Groove in Bearing—Groove dividing the bearing into two narrower parts increases the friction and causes a relatively high critical ZN/P. High friction is counteracted by high oil flow and rate of heat dissipation.

The Right Combination

Sometimes, finding the right combination to speed up production is a difficult task. But if you keep working at it perhaps a few simple fixtures coupled with the right heating medium may do the trick.

Case in point is the Vacuum Can Co. of Chicago. This manufacturer which turns out small electric hot-water tanks jumped its production about 50 per cent, and it did it with fixtures. The fixtures are used in applying induction heat to silver solder two stainless steel nipples at a time into the stainless heads of heater tanks.

In the operation, the worker places the tank head, with nipples and solder rings ready for brazing, on a supporting drum. A foot-actuated air cylinder raises the tank head into position for brazing and turns on the heat as the fixtures support the nipples in position. After a preset heating cycle, the brazed assembly is automatically lowered into unloading position. Formerly, hand torches were used for the job with nonuniform results and considerable rejects.

One Oil Hole in Shaft—Passage of one oil hole across the loaded portion of the oil film has little effect on both friction and critical ZN/P, which are only slightly higher than for the arrangement with one hole in the bearing. When the hole is exposed to some portions of the loaded area, the oil feed is practically shut off. Consequently, this arrangement results in the lowest oil flow and rate of heat dissipation.

Two Oil Holes in Shaft—With two oil holes for each journal, the disturbance to film-pressure development occurs twice in a revolution, resulting in slightly higher friction and critical ZN/P than with

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ERIE Board Drop Hammers

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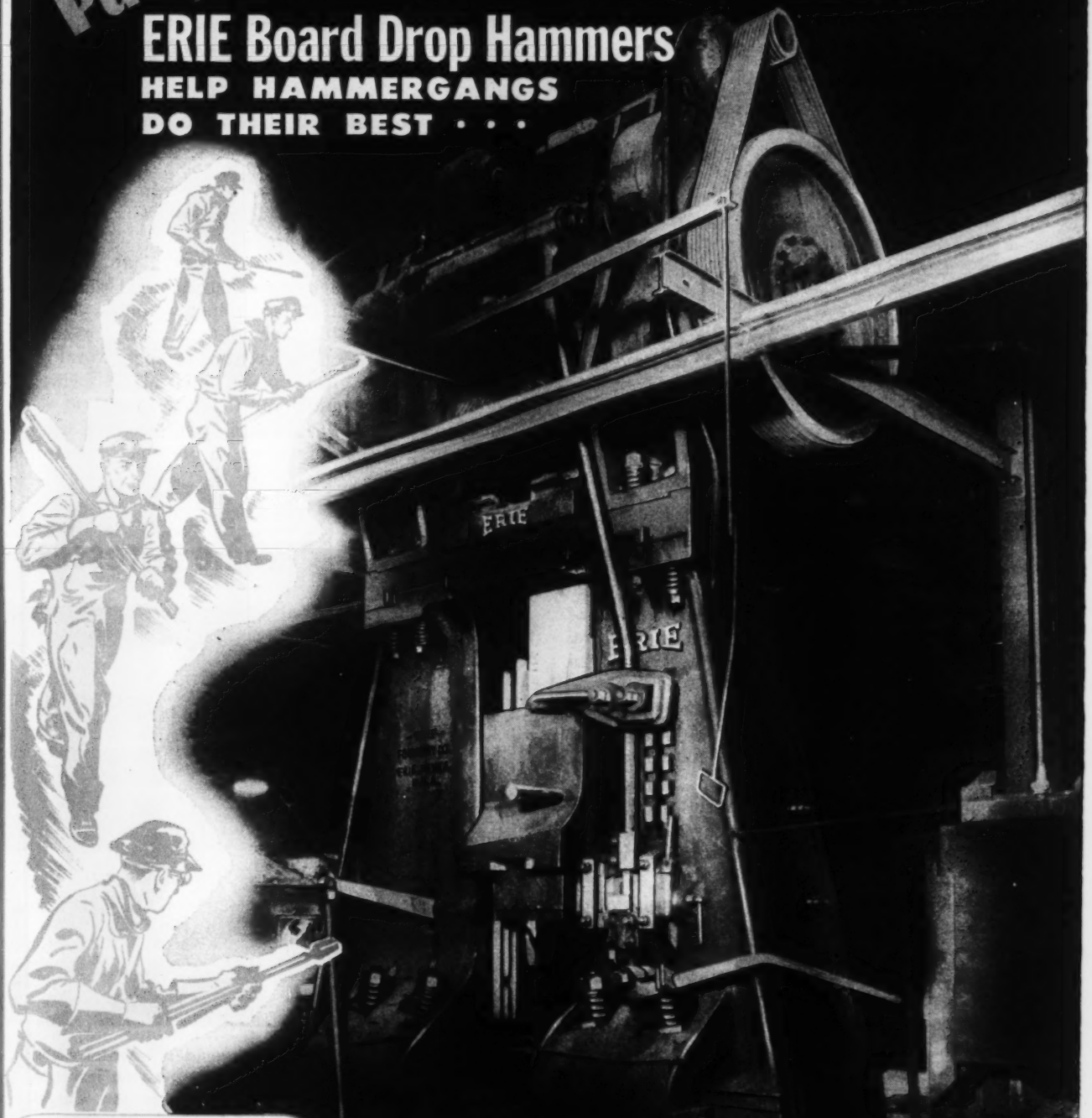


ERIE

WRITE FOR BULLETIN NO. 352

ON ERIE HAMMERS ALL STRESSED PARTS, UPPER WORKS, FRAME AND ANVIL ARE STEEL.

ERIE FOUNDRY COMPANY · ERIE, PA.

ERIE BUILDS *Dependable* HAMMERS

the arrangement of one hole in the shaft. Two holes give a greater oil flow and rate of heat dissipation.

One Oil Hole with Flat in Shaft—The flat at the end of the oil hole causes considerable disturbance to the development of pressure in the oil film, increases the friction, and markedly increases the critical value of ZN/P. The oil flow and rate of heat dissipation are higher than in the arrangement with one hole in the shaft without the flat but not sufficient to counteract the effect of high ZN/P at transition from stable to unstable lubrication.

Results of these tests apply directly to unidirectionally loaded bearings for the particular range of conditions covered. The indicated differences between the various arrangements do not necessarily indicate more complex conditions where the load varies in both intensity and direction with respect to the bearings. It is believed, however, that the relative values obtained may be useful qualitatively in estimating the over-all effects of various arrangements of holes or grooves under more complex loading conditions, especially if proper consideration is given to conditions present throughout the load cycle.

How Tests Were Made—The four-bearing friction machine consists of four similar test bearings enclosed in a housing and mounted on a common shaft. The complete unit of bearings and housing acts as a cradle dynamometer. Loads are applied by hydraulic jacks which form the base of the housing. Frictional torque is measured by a dynamometer scale acting through a torque arm fitted to the housing while an automatic device, provided in the hydraulic system, releases the load under the high-torque conditions that occur near bearing seizure.

The test shafts were carburized steel, heat treated to hardnesses ranging from 55 to 61 Rockwell C and ground to a surface roughness ranging from 4 to 5 microinches (rms profilometer). Journal diameters were measured at each of the four journals on each shaft. Test bearings of solid steel sleeves with copper-lead linings were pressed in the bearing retainers, rough-bored in a lathe, assembled in the housing swivels, and then finished to size with a reamer having a single cutting edge.

Bearing diameters were measured at the axial center and near each end. The nominal dimensions were a shaft diameter of 2 inches and a 1¼-inch bearing length. With each oil-feed arrangement two sets of bearings of different clearance were used. These provided D/C ratios of 663 and 403, where D is the journal diameter and C is the diametral clearance. On SAE 20 motor oil was used in all the tests and was maintained at an oil-inlet temperature of 200° F.

New Plastic Provides "Internal Vision" of Machine Stresses

NEW plastic that can be made into scale models of machine parts and tools, now is providing "internal vision" for engineers in military, university, and industrial laboratories, according to the Westinghouse scientists. Three-dimensional scale models cut from the plastic enable scientists to get a "portrait in color" of the strains encountered in tools, machine parts, and other objects.

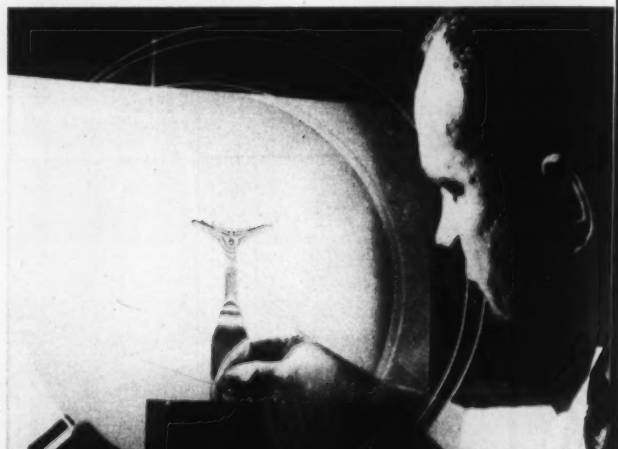
Co-developed by Milton M. Leven and Herbert F. Minter of the Westinghouse Research Laboratories, Pittsburgh, the plastic can be cast in cylindrical or rectangular chunks 8 inches in diameter or in width and 36 inches in length.

Aids Design of Gun Parts—One of the major applications of the new material is in the design of breech blocks for big guns. To understand the terrific stresses these parts undergo during firing of the gun, an exact three-dimensional model of the block has been built and "loaded" to simulate the stress.

When frozen into the material and then viewed through special polarized light, the stress pattern appears as a series of vari-colored lines that tell the scientist where the major stresses are located, in which direction they are acting, and just how great they are.

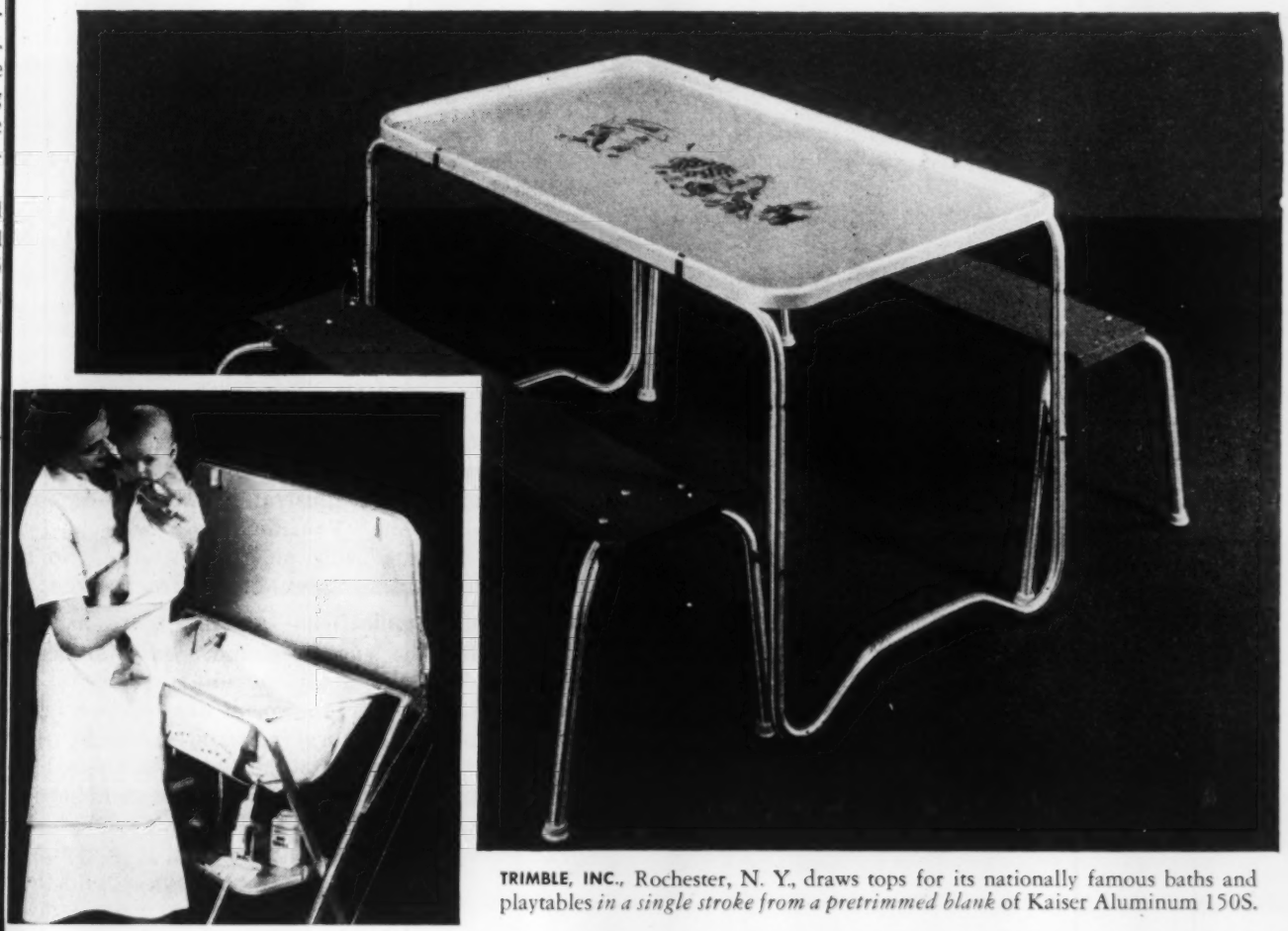
The new plastic also is being used by scientists at Rolls-Royce, one of England's leading airplane engine manufacturers, National Tube Co., U. S. Naval Gun Factory, David Taylor Model Basin, Watertown Arsenal, Massachusetts Institute of Technology and the universities of Purdue, Cornell and Harvard.

The material is a modified form of Fosterite—a tough, waterproof material developed during World War II to seal radio and radar parts against harmful moisture.



Here is how the new plastic provides "internal vision" for engineers. Model shows what goes on inside an engine valve after a workout by the piston. Curving lines around the valve head reveal that the load is favorably distributed and design of valve excellent

This type Fosterite is 35 per cent more sensitive than the standard photo-plastic. As a result, many more stress lines appear when the model, or a slice of it, is viewed through polarized light. Since counting these lines is an essential part of analyzing the stress pattern, the more lines there are, the more accurate the diagnosis.



TRIMBLE, INC., Rochester, N. Y., draws tops for its nationally famous baths and playtables *in a single stroke from a pretrimmed blank* of Kaiser Aluminum 150S.

Trimble trims costs, improves products with new 150S

TRIMBLE, INC., previously produced their tray top, shown on the Playtable and Kiddie Bath above, from 52SH32 aluminum. Now, after a gauge for gauge conversion, they're using Kaiser Aluminum 150SH36—*and getting a better product at lower cost!*

Kaiser Aluminum 150S gives them increased dent resistance! Kaiser Aluminum 150S gives them a more attractive etched finish! Kaiser Aluminum 150S gives them the required strength!

And the lower material cost of Kaiser Aluminum 150S is a cash-in-hand advantage to Trimble—and scores of other manufacturers!

Why not let 150S—the world's most versatile aluminum alloy—go to work for *you?*

IF YOU'RE USING 3S, you'll get up to 40 per cent greater strength in finished parts by changing to 150S. Nearly the same workability. Harder surface. Finer grain structure. High lustre buffing. Superior etch finishes.

And up to 10 per cent less material cost where greater strength allows gauge reduction.

Give your product the advantages that only Kaiser Aluminum 150S can give it. Call the nearest Kaiser Aluminum office today for more information!

Kaiser Aluminum

A major producer in a growing industry

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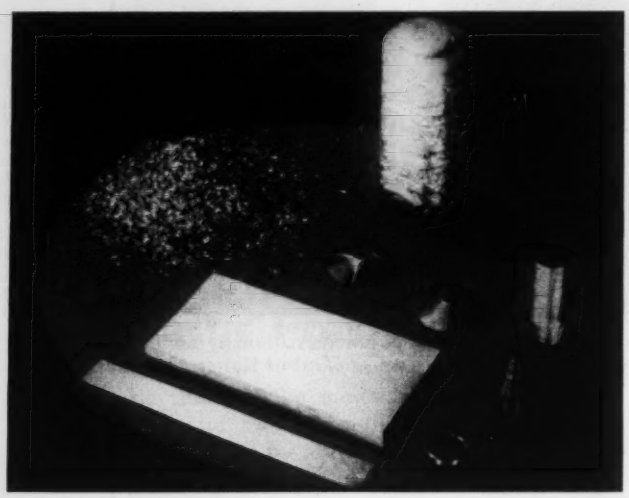
Vanadium Now Available Commercially

A HIGH-PURITY, ductile vanadium metal is now available in limited quantities for fabrication and use by the metal industry, according to the Electro Metallurgical Division of Union Carbide & Carbon Corp., New York.

The metal which averages above 99.8 per cent vanadium, is made in the form of ingots, bars, sheet, and foil. It is also available in the form of chips for remelting into ingots of special sizes and shapes.

Physical and Chemical Properties—Pure vanadium has good corrosion resistance, high tensile strength and excellent ductility. It is highly resistant to corrosion by salt spray, sea water and reducing acids



New high-purity vanadium metal is now available in form of ingots, plates, bars, sheet and strip as well as chips for remelting. Shown here are some fabricated shapes including Belleville-type springs, a conical helical spring, ring and welded tube

in moderate concentrations. Tests to date indicate that it has good antifouling characteristics.

The metal has a modulus of elasticity of about 22 million psi and a density of 6.1. The modulus-density ratio for vanadium is practically the same as that for steel (3.7 million), although the density of vanadium is appreciably lower than that of steel. This compares with a modulus-density ratio for titanium variously given as 3.1 to 3.6 million. From this, it can be seen that vanadium metal has a very favorable strength-weight ratio.

The high modulus-weight ratio of vanadium metal suggests its use for structural parts in which flexural rigidity is the important factor. Its high strength, combined with its resistance to salt water, suggests its use for instrument parts subjected to high dynamic stress in marine atmospheres. The metal also has good static tensile properties which should make it suitable as a spring material.

Fabrication Properties—Vanadium ingots can be hot-rolled at temperatures between 1475 and 2100° F. Rolling practice, with respect to passes and reduction, follows that established for austenitic stainless steels. Sheet bar stock does not work-harden appreciably even during cold-working and may be rolled to a sheet having a thickness of 0.020-inch. In fact, a reduction of 85 per cent can be made without intermediate annealing.

The machinability of vanadium is about the same as that of cold-rolled steel. The metal is free-cutting and can be machined more readily than nickel, stainless steel and titanium. High cutting speeds can be used to produce good surface finishes.

Vanadium metal has good workability and may be formed, bent, stamped, and pressed in the usual manner. For example, the Belleville-type springs shown in the accompanying illustration were made in a simple lead-lined die. Vanadium may be welded by the Heliarc process using an argon atmosphere for shielding. It has smooth welding characteristics.

Engineering Applications—As yet, there has not been time for the engineers and men who design products to use and apply vanadium metal to any great extent. However, the metal has the two prime requisites for a structural material: Namely, good mechanical and chemical stability. With these basically good properties, in a unique new combination, the metal is well fitted to stand on its own feet. Although vanadium is new commercially, it is available in sufficient quantities for engineering applications that may develop.

Production Facilities Described

Are you looking for a company that can bore and hone holes 40 feet in length and 42 inches in diameter to a mirror-like finish? Illustrations of machines which can perform this operation are included in a brochure of McKiernan-Terry Corp., 15 Park Row, New York 7, N. Y. It illustrates the production facilities for the manufacture of a wide range of special machinery, subassemblies and precision parts.

Shown are some of the company's 30 vertical and horizontal boring units, 70 turret and engine lathes up to 95 feet long, plus many other machines, including radial drills, grinders, planers and millers. The company also performs welding and stress relieving.

Tape Protects Stainless Surfaces

Applied to sheets of stainless steel to protect its surface against scratches and die marks during shipment, storage, fabrication, and after-fabrication shipment and storage is a protective tape with an adhesive which enables it to stick immediately upon contact. Made by Minnesota Mining & Mfg. Co., St. Paul, Minn., it is used with other highly polished metals and some plated metals.

Tape is a rubbery protective film which stretches with the metal during fabrication. A paper backing eliminates wrinkling during long periods of storage. Patterns may be traced on the backing, which is white. Tape is furnished in 100-yard rolls in widths of 12, 24 and 36 inches.

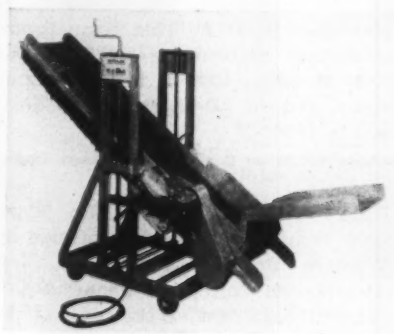
wheels. It also features a finger-tip control parking brake. Both models have a hydraulic tilt mechanism operating heavy duty cylinders inside the frame above the drive wheel.

Lift height of model E is 68 inches, while on model ER it is 108 inches. Free lift is 37 and 57 inches, respectively.

Check No. 7 on Reply Card for more Details

Covers Wide Realm of Handling

Intended to handle small stampings, castings, borings, turnings, chips and granular material, the Little Hustler portable conveyor, built by May-Fran Engineering Inc., 1725 Clarkstone Rd., Cleveland 12, O., is suited for use with permanent con-



veyor systems as an auxiliary unit to feed or discharge high production items. Working height is regulated through a 30-inch range by means of a double screw center lift. Crank handle on the conveyor facilitates pitch adjustment from horizontal to a maximum of 45 degrees. Two swivel and two stationary casters provide portability.

Of all-steel welded construction, the units are available in 4, 6, 8, 10 and 12-foot lengths with belts 12, 18 or 24 inches wide. Either cleated white cotton or Neoprene-impregnated belting is available. A charging chute with trap is standard equip-

Already Proved in Service!

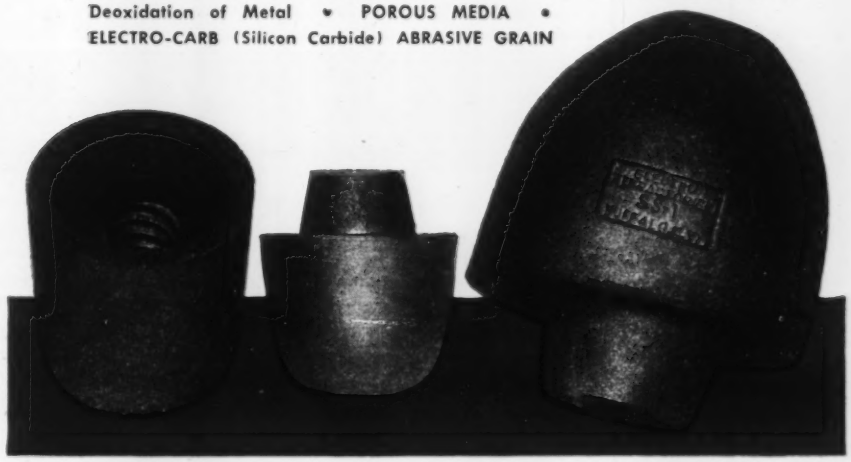
Electro's new Stopper Heads do not develop internal leakage-source cracks. Not one has ever shown spalling cracks or failed during assembly. These new Heads assure cleaner shut-offs, resist abrasion and eliminate sticking at the nozzle. Their hot load-bearing capacity is maximum; and their uniformity and dependability are up to Electro's well-known standard. Every executive concerned with open hearth, steel foundry and electric furnace melting should send **now** for Bulletin S-750 which gives details.

Electro SINCE 1919

Electro Refractories & Alloys Corporation

WEST COAST WAREHOUSE, LOS ANGELES
344 DELAWARE AVE., BUFFALO 2, N. Y.

STOPPER HEADS • CRUCIBLES REFRACTORIES, Standard and Special Shapes • HIGH SPEED GRINDING WHEELS • Electro-Carb BRIQUETS for Deoxidation of Metal • POROUS MEDIA • ELECTRO-CARB (Silicon Carbide) ABRASIVE GRAIN



ment. For operations in congested areas, a special swivel charging chute which permits feeding at any point within a 180 degree radius can be furnished.

Check No. 8 on Reply Card for more Details

Improvements in the Iron Hand

Improvements in the Iron Hand, built by Sahlin Engineering Co., 267 Ferndale St., Birmingham, Mich., to automatically unload stamping presses, include a longer stroke and reach into the die which makes possible handling of a greater variety of stampings. New assembly is lighter, has 30 per cent fewer moving parts, besides having a cam assembly which minimizes vibration and provides a rigid mounting.

Cycle time has been increased 20 per cent by enlarging airline connections. Strokes per minute range is increased from 12 to 20. A limit switch stops the press midway in its downstroke if the jaws do not retract properly to rest position due to failure in the airline. A chisel type jaw blade eliminates need to use lifters in the die in most cases.

Check No. 9 on Reply Card for more Details

Vibrating Feeder Is Mechanical

Employing mechanical operation which eliminates many parts is the Vibra-Feeder, made by Robins Conveyors Division, Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J. It requires no other electrical accessories than a light-duty plug and receptacle and draws less than 2 amp. Feeder cannot be overloaded because its vibrating action is fully mechanical and will not damp out. Capacity is limited only by the size of the pan.

Operation may be horizontally, downhill or slightly uphill, depending on the nature of the material and depth of load. To increase rate of travel, the discharge end is declined. About 15 per cent more capacity is obtained for every 5 degrees of downhill operation. Feeder is available in a range of sizes from 24 to 48 inches wide and 48 to 96 inches long.

Check No. 10 on Reply Card for more Details

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FOR INSPECTION: No. 653 dial comparator, available from L. S. Starrett Co., Athol, Mass., is designed for inspection operations. It has ribbed base-platen precision ground to close limits and approximately 8 x 9 inches in area which accommodates all types of work as well as various V-blocks and special fixtures. Indicator is graduated in 0.001-inch, dial reading 0-50-0, range 0.250-inch. Other types are available if specified.

Check No. 11 on Reply Card for more Details

TIGHTEN OR LOOSEN: With a twist in the desired direction and a few raps with a hammer, screws, bolts or nuts can be tightened or loosened with the Impakdriver, announced by H. K. Porter Inc., Somerville, Mass. It is available by itself or in sets with different combinations of bits and sockets for various sizes and types of screws, bolts and nuts.

Check No. 12 on Reply Card for more Details

PORTABLE BAR RACKS: New portable heavy duty bar racks, designed for handling and storage of steel bundles by one-man operation, are available from Palmer-Shile Co., Detroit 27, Mich. Use of this equipment enables operator to place bundles in racks for storage in tiers.

Check No. 13 on Reply Card for more Details

SPEEDS STRIPPING: Strip-Aid, developed by Klem Chemicals Inc., Dearborn, Mich., is a patented compound which added in small quantities to alkaline type paint strippers speeds action of the strippers. It may be used on ferrous metal and is recommended for stripping modified alkyd paints and nitro-cellulose lacquers.

Check No. 14 on Reply Card for more Details

CABINET BENCHES: Standard Pressed Steel Co., Jenkintown, Pa., offers Hallowell cabinet benches of steel. Units have free-sliding doors, roller-bearing drawers and adjustable shelves. Top may be of steel or of laminated hardwood.

Check No. 15 on Reply Card for more Details

VISE FOR BENCH MOUNTING: Palmgren No. 1252 bench drill press vise, made by Chicago Tool & Engineering Co., Chicago 17, Ill., is equipped with a swivel bench base and adapter for bench mounting. It can be rotated 360 degrees horizontally and locked in position. Jaws of vise are 2½ inches wide, 1 inch deep and open 2½ inches.

Check No. 16 on Reply Card for more Details

REPAIRS FLOORS: Two new floor resurfacers developed by Monroe Co. Inc., Cleveland 6, O., are Rezilo for wood floors and Steelhard for concrete floors. The plasticized floorings are applied directly on the surface and may be put on at any time without disrupting traffic.

Check No. 17 on Reply Card for more Details

WIRE STRIPPERS: New wire strippers, announced by Rush Wire Stripper Division, Eraser Co. Inc., Syracuse 2, N. Y., operate on the principle of frictionally generated heat to melt the insulation. The stripping wheels brush it off the wires. Frictional heat is the result of the revolving stripping wheels at high speed and accurately controlling pressure of wheels on wire being stripped and using wheels fitted to the job.

Check No. 18 on Reply Card for more Details

HYDRAULIC CYLINDERS: Hanna Engineering Works, Chicago, Ill., offers a new line of high pressure hydraulic cylinders meeting J.I.C. standards. Designed for working pressures up to 1500 psi, units are used for push, pull, lift, press, clamp or control power in many applications. Eight standard mounting styles are available.

Check No. 19 on Reply Card for more Details

FOR DUCTWORK: Designed for ductwork applications, two new vane-axial type, medium pressure propeller fans are introduced by Robbins & Myers Inc., Springfield 99, O. They permit series or straight-through connections for all air-moving requirements. Units may be installed in standard 20 and 24-inch diameter duct systems.

Check No. 20 on Reply Card for more Details

TEMPERATURE INDICATORS: Tempil Corp., New York 11, N. Y., has developed additional high temperature ratings of Tempilaq to indicate 1650, 1700, 1750, 1800, 1850, 1900 and 1950° F. This temperature indicating material is available for 113° F up to 400° F in 12½-degree steps and in 50-degree steps from 400 to 1950° F.

Check No. 21 on Reply Card for more Details

HEAVY DUTY SWEEPER: Model 1000 heavy duty sweeper, offered by Wilshire Power Sweeper Co., Los Angeles 26, Calif., has an adjustable "antifatigue" seat on the front of the unit, giving the operator a complete view of the sweeping area. Dust is eliminated as it is sucked up into the hopper. Sweeper is equipped with eight dual brushes of Tampico fiber and spring steel wire mix.

Check No. 22 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEELMAKERS enter fourth quarter with books so heavily loaded with orders virtually no openings in rolling schedules in any products are in prospect for the period. Carryover third quarter tonnage is so large a substantial portion of output in the closing months of the year will be required to care for the overflow. The mills, seeking to become current on most products by yearend, are not booking new orders for fourth quarter. They are turning away customers' requests wholesale, sticking rigidly to established quotas. With consumer allotments reduced, and subject to further cutbacks as military orders develop, all the signs point to increasing supply stringency..

ALLOCATIONS— Not much change in supply conditions is indicated as result of military and other emergency allocations. For that matter, establishment of an allocations authority is proceeding at such slow pace it likely will be first quarter before actual government directives will be effected. Meanwhile, the steelmakers are giving the green light to emergency demands, these being inserted in rolling schedules at expense of civilian account. Some civilian orders for first quarter have been accepted but delivery promises mean little in light of impending military allocations. So far emergency requirements represent but a small portion of total demand. But the volume is growing steadily. Even though the Korean war is quickly ended no particular change in the civilian steel supply outlook is anticipated. Armament and other emergency needs, it is indicated, will continue to swell as projected rearmament and European military aid programs reach active stage.

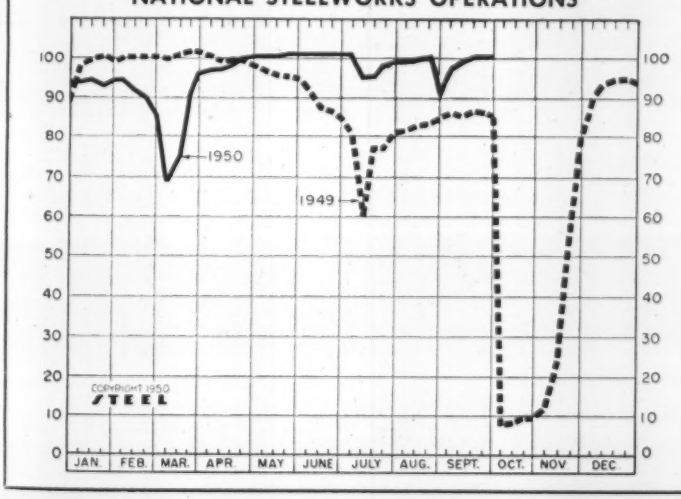
PRODUCTION— Steelmaking is being pushed to the limit of available facilities. Weekly output of ingot and steel for castings is equal to around 1,945,000 tons, a record. Wildcat strikes at steel mills in various centers, however, are adversely affecting production of some finished products, especially wire items. These production interruptions are playing hob with shipping schedules. For the most part, it is expected production of steel, barring serious labor trouble, will be maintained at, or close to, capacity indefinitely into the future. On the basis of production so far this year and maintenance of operations at the current rate over coming months, output for all of 1950 will set a new record around 97 million tons. The previous alltime high was in 1944 when 89,641,600 net tons were produced.

OPERATIONS— The national ingot rate last week held at 101 per cent of capacity for the third successive week. Increases at some production points were just about offset by decreases at others.

PRICES— Advances of $3 per ton on pig iron, initiated a week ago at Buffalo and Cleveland, have spread to most other production points. Southern iron producers raised their prices $3.50 per ton. Exceptions to the general advance are subsidiaries of the United States Steel Corp. and various eastern producers who are reported so heavily booked they have no tonnage for sale. Isolated increases in finished steel prices continue to be made, but the market as a whole displays remarkable stability in the face of steadily rising costs. Threat to this stability looms, however, with labor pressing for a sharp wage increase. Expectations are the steelmakers will delay acting on prices until the wage question is settled.

COMPOSITES— As result of recent advances STEEL's composite pig iron prices rose from 72 cents to $1.12 per ton on the average, with basic $47.72, No. 2 foundry, $48.84 and malleable, $49.13. The weighted index on finished steel is unchanged at 156.99 as is the arithmetical composite at $94.50. The steelmaking scrap composite is up slightly to $41.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Sept. 30	Change	Same Week 1949	Same Week 1948
Pittsburgh	101	— 1.5*	81.5	95
Chicago	103	— .5*	91	97
Eastern Pa.	99	0	80	93
Youngstown	106	+ 1	94	103
Wheeling	98	0	91.5	93.5
Cleveland	98	— 2	102.5	97.5
Buffalo	104	0	79.5	104
Birmingham	100	0	100	100
New England	82	—11	71	84
Cincinnati	103	0	92	103
St. Louis	92	+11	84.5	91.5
Detroit	106	+ 4	52	101
Western	105	+ 2	77	..
Estimated national rate	101	0	85	96

Based on weekly steelmaking capacity of 1,906,267 net tons for first half and 1,926,803 second half, 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948. *Change from revised rate.

News Summary—p. 51 Production-Engineering News—p. 81

Composite Market Averages

	Sept. 28 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.99	156.99	156.99	152.52	101.87
Index in cents per lb. ..	4.253	4.253	4.253	4.132	2.760
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.50	$94.50	$94.50	$91.55	$58.27
No. 2 Fdry, Pig Iron, GT	48.84	47.72	46.85	46.10	24.67
Basic Pig Iron, GT	47.72	46.72	45.97	45.60	24.00
Malleable Pig Iron, GT..	49.13	48.41	47.49	47.27	25.29
Steelmaking Scrap, GT..	41.00	40.58	42.50	27.08	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Sept. 28 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35	2.25
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, H.R., del. Philadelphia	3.93	3.93	3.93	3.83	2.57
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95–4.00	2.75
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Shapes, del. Philadelphia..	3.46	3.46	3.46	3.50	2.215
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa. ...	3.90	3.90	3.90	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.40	2.25
Plates, Claymont, Del. ...	3.90	3.90	3.90	3.50	2.25
Plates, del. Philadelphia ..	3.84	3.84	3.84	3.59	2.30
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh ..	3.50	3.50	3.50	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh	4.15–50	4.15–50	4.15–50	4.00	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–95	4.35–95	4.35–95	4.20–25	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh ...	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT)	58.00	58.00	58.00	56.00	36.00
Wire rods, ½-⅝", Pitts...	3.85	3.85	3.85	3.40	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47-$50	$47-$50	$47-$50	$47.00	$26.19
Basic, Valley	46.00-49.00	46-49	46.00	46.00	24.50
Basic, del. Phila.	50.39	50.39	50.39	49.44	26.34
No. 2 Fdry, Pitts.	49.50	49.50	49.50	46.50	25.69
No. 2 Fdry, Chicago..	46.50-49.50	46.50-49.50	46.50	46.50	25.00
No. 2 Fdry, Valley	49.50	49.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	50.89	50.89	50.89	49.94	26.84
No. 2 Fdry, Birm.	45.88	42.38	42.38	39.38	21.38
No. 2 Fdry (Birm.) del. Cin.	52.58	49.08	49.08	45.43	25.30
Malleable, Valley	49.50	49.50	46.50	46.50	25.00
Malleable, Chicago ...	46.50-49.50	46.50-49.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$44.00	$44.00	$46.00	$29.75	$20.00
No. 1 Heavy Melt. E. Pa..	39.00	37.75	41.50	25.00	18.75
No. 1 Heavy Melt, Chicago	40.00	40.00	40.00	26.50	18.75
No. 1 Heavy Melt. Valley..	43.75	43.75	46.25	31.25	20.00
No. 1 Heavy Melt. Cleve. .	43.25	43.25	43.25	26.50	19.50
No. 1 Heavy Melt. Buffalo.	41.50	41.50	39.75	28.25	19.25
Rails, Rerolling, Chicago ..	61.00	59.50	56.50	41.50	22.25
No. 1 Cast, Chicago	50.50	50.50	49.50	41.50	20.00

Coke, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$13.25	$7.50
Beehive, Fdry., Connlsvl...	16.50	16.00	15.50	15.75	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.00	13.35

NONFERROUS METALS

Copper, del. Conn...	22.50-24.50	22.50-24.50	22.50-24.50	17.625	12.00
Zinc, E. St. Louis	17.50	17.50	15.00	10.00	8.25
Lead, St. Louis	15.80	15.80	13.80	14.925	6.35
Tin, New York	103.00	103.00	104.00	103.00	52.00
Aluminum, del.	17.50-19.00	17.50	17.50	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	24.50	38.50	14.50
Nickel, refinery, duty paid.	48.00	48.00	48.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Brooklyn, N.Y., del.	....	52.79	53.29	....
Newark, del.	50.63	51.13	51.63	52.13
Philadelphia, del.	50.39	50.89	51.39	51.89
Birmingham District				
AlabamaCity, Ala. R2	45.38	45.88	....	....
Birmingham R2	45.38	45.88	....	....
Birmingham S9	45.38	45.88	....	....
Woodward, Ala. W15	45.38	45.88	....	....
Cincinnati, del.	....	52.58	....	....
Buffalo District				
Buffalo H1, R2	49.00	49.50	50.00	....
Tonawanda, N.Y., W12	49.00	49.50	50.00	....
N. Tonawanda, N.Y., T9	....	49.50	50.00	....
Boston, del.	58.26	58.76	59.20	....
Rochester, N.Y., del.	51.63	52.13	52.63	....
Syracuse, N.Y., del.	52.58	53.08	53.58	....
Chicago District				
Chicago I-3	49.00	49.50	49.50	50.00
Gary, Ind. C3	46.00	....	46.50	....
IndianaHarbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14	46.00	46.50	46.50	....
So. Chicago, Ill. Y1	49.00	49.50	49.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	49.00	49.50	49.50	....
Akron, del. from Cleve.	51.39	51.89	51.89	52.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	49.50	....
Erie, Pa. I-3	49.00	49.50	49.50	50.00
Everett, Mass. E1	....	52.25	52.75	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
LosAngeles, SanFrancisco, del.	53.70	54.20	....	....
GraniteCity, Ill. M10	50.90	51.40	51.90	....
St. Louis, del. (inc. tax)	51.65	52.15	52.65	....
Ironton, Utah C11	46.00	46.50	....	....
LoneStar, Tex. L6	45.00	45.50	45.50	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland, Pa. P6	....	49.50	49.50	50.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	50.69	50.69	51.19
McKeesRocks, del.	....	50.45	50.45	50.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	50.94	50.94	51.44
Verona, del.	....	51.40	51.40	51.90
Brackenridge, del.	....	51.63	51.63	52.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	....	....	49.50	50.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Swedeland, Pa. A3	50.00	50.50	51.00	51.50
Toledo, O. I-3	49.00	49.50	49.50	50.00
Cincinnati, del.	54.01	54.51	....	....
Troy, N.Y., R2	51.00	51.50	52.00	52.50
Youngstown District				
Hubbard, O. Y1	49.00	49.50	49.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	49.00	49.50	49.50	50.00
Mansfield, O., del.	50.26	53.76	53.76	51.26

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75 2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.0
Buffalo H1	58.5

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls, N.Y. P15	$78.0
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	82.0
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2...	86.0
Wenatchee, Wash., OH & Fdry., frt. allowed K2	82.0

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$62.0

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.0
Steelton, Pa. B2	54.0
Philadelphia delivered	57.0
Troy, N.Y. R2	57.0

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Sept. 28, 1950; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7 ..... $50.00
Fontana,Calif. K1 ....76.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)

Detroit R7 ..... $51.00
Fontana,Calif. K1 ....77.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ..51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)

Bessemer,Pa. C3 ....$53.00
Clairton,Pa. C3 .....53.00
Conshohocken,Pa. A3 ..62.00
Ensley,Ala. T2 .....53.00
Fairfield,Ala. T2 .....53.00
Fontana,Calif. K1 ....72.00
Gary,Ind. C3 .....53.00
Johnstown,Pa. B2 ....53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 .....53.00
So.Chicago,Ill. C3 ...53.00
So.Duquesne,Pa. C3 ...53.00

Carbon, Forging (NT)

Bessemer,Pa. C3 .....$63.00
Buffalo R2 .....63.00
Canton,O. R2 .....63.00
Clairton,Pa. C3 .....63.00
Cleveland R2 .....63.00
Conshohocken,Pa. A3...68.00
Detroit R7 .....66.00
Ensley,Ala. T2 .....63.00
Fairfield,Ala. T2 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Geneva,Utah G1 .....63.00
Houston,Tex. S5 .....71.00
Ind.Harbor,Ind. I-2 ...63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2...63.00
LosAngeles B3 .....82.00
Munhall,Pa. C3 .....63.00
Seattle B3 .....82.00
So.Chicago C3,R2,W14..63.00
So.Duquesne,Pa. C3 ..63.00
So.SanFrancisco B3 ...82.00

Alloy (NT)

Bethlehem,Pa. B2 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2, T7 ....66.00
Conshohocken,Pa. A3..70.00
Detroit R7 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....66.00
Houston,Tex. S5 .....74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....86.00
Massillon,O. R2 .....66.00
Midland,Pa. C18 .....66.00
Munhall,Pa. C3 .....66.00
Sharon,Pa. S3 .....66.00
So.Chicago C3,R2,W14.66.00
So.Duquesne,Pa. C3 ..66.00
Warren,O. C17 .....66.00
Youngstown Y1 .....66.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Fontana,Calif. K1 ....100.00
Gary,Ind. C3 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00
So.Duquesne,Pa. C3 ...76.00

SHEETS BARS (NT)

Fontana,Calif. K1 ....$86.00

SKELP

Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.15
Warren,O. R2 .....3.15
Youngstown C3, R2 ....3.15

WIRE RODS

AlabamaCity,Ala. R2 ..3.85
Buffalo W12 .....3.85
Cleveland A7 .....3.85
Donora,Pa. A7 .....3.85
Fairfield,Ala. T2 .....3.85
Fontana,Calif. K1 ....4.60
Houston,Tex. S5 .....4.25
Ind.Harbor,Ind. Y1 ...3.85
Johnstown,Pa. B2 ....3.85
Joliet,Ill. A7 .....3.85
LosAngeles B3 .....4.65
Minnequa,Colo. C10 ....4.10
Monessen,Pa. P7 .....3.85
So.Tonawanda,N.Y. B11.3.85
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J. R5 .....3.95
So.Chicago,Ill. R2 .....3.85
SparrowsPoint,Md. B2..3.95
Sterling,Ill.(1) N15 ....3.85
Struthers,O. Y1 .....3.85
Torrance,Calif. C11 ...4.65
Worcester A7 .....4.15

STRUCTURALS

Carbon Steel Stand. Shapes

AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Bessemer,Ala. T2 .....3.40
Bethlehem,Pa. B2 .....3.45
Clairton,Pa. C3 .....3.40
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 ....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2 ....3.40
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.00
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.00
Minnequa,Colo. C10 ...3.75
Munhall,Pa. C3 .....3.40
Niles,Calif.(22) P1 ....4.02
Phoenixville,Pa. P4 ...4.25
Portland,Oreg. O4 ....4.05
Seattle B3 .....4.05
So.Chicago,Ill. C3, W14.3.40
So.SanFrancisco B3 ....3.95
Torrance,Calif. C11 ....4.00
Weirton,W.Va. W6 ....3.40

Alloy Stand. Shapes

Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 ....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 ....4.05

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....5.15
Bessemer,Ala. T2 .....5.15
Bethlehem,Pa.(14) B2...5.20
Clairton,Pa. C3 .....5.15
Fairfield,Ala. T2 .....5.15
Fontana,Calif. K1 ....5.75
Gary,Ind. C3 .....5.15
Geneva,Utah G1 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y.(14)B2 5.20
LosAngeles B3 .....5.75
Munhall,Pa. C3 .....5.15
So.Chicago,Ill. C3 .....5.15
So.SanFrancisco B3 ....5.70
Struthers,O. Y1 .....5.15

Wide Flange

Bethlehem,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 ....3.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
Munhall,Pa. C3 .....5.10
So.Chicago,Ill. C3 .....5.10

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 ....4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 .....4.20
So.Chicago,Ill. C3 .....4.20
Weirton,W.Va. W6 ....4.20

BEARING PILES

Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 .....3.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.35
Bessemer,Ala. T2 .....5.35
Clairton,Pa. C3 .....5.35
Cleveland J5, R2 .....5.35
Conshohocken,Pa. A3 ..5.35
Ecorse,Mich. G5 .....5.60
Fairfield,Ala. T2 .....5.35
Fontana,Calif. K1 ....5.95
Gary,Ind. C3 .....5.35
Geneva,Utah G1 .....5.35
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 .....5.35
Munhall,Pa. C3 .....5.35
Pittsburgh J5 .....5.35
Sharon,Pa. S3 .....5.35
So.Chicago,Ill. C3 ....5.35
SparrowsPoint,Md. B2..5.35
Warren,O. R2 .....5.35
Youngstown Y1 .....5.35

PLATES, Open-Hearth Alloy

Claymont,Del. W16 ....4.50
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ...4.55
Fontana,Calif. K1 ....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

FLOOR PLATES

Cleveland J5 .....4.55
Conshohocken,Pa. A3 ..4.55
Harrisburg,Pa. C5 ....5.25
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 ....4.55

PLATES (Universal Mill)

Fontana,Calif. K1 ....4.40

PLATES, Carbon A.R.

Fontana,Calif. K1 ....5.25

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 .....3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 .....3.50
Clairton,Pa. C3 .....3.50
Claymont,Del. W16 ....3.90
Cleveland J5 R2 .....3.50
Coatesville,Pa. L7 ....3.90
Conshohocken,Pa. A3 ..3.75
Ecorse,Mich. G5 .....3.75
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.50
Geneva,Utah G1 .....3.50
Harrisburg,Pa. C5 ....4.25
Houston,Tex. S5 .....3.90
Ind.Harbor,Ind. I-2, Y1..3.50
Johnstown,Pa. B2 .....3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.50
Pittsburgh J5 .....3.50
Seattle B3 .....4.40
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2 ..3.50
Steubenville,O. W10 ....3.50
Warren,O. R2 .....3.50
Weirton,W.Va. W6 ....3.50
Youngstown C3, R2, Y1.3.50

PLATES, Wrought Iron

Economy,Pa. B14 ....7.85

PLATES, Ingot Iron

Ashland,c.l.(15) A10 ...3.75
Ashland,lcl(15) A10 ...4.25
Cleveland,cl R2 .....4.10
Warren,O.cl R2 .....4.10

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ..3.45
Aliquippa,Pa. J5 .....3.45
Alton,Ill(1) L1 .....3.45
Atlanta,Ga. A11 .....3.60
Bessemer,Ala. T2 .....3.45
Buffalo R2 .....3.45
Canton,O. R2 .....3.45
Clairton,Pa. C3 .....3.45
Cleveland R2 .....3.45
Ecorse,Mich. G5 .....3.65
Emeryville,Calif. J7 ....4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.70
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 ....4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
Seattle B3, N14 .....4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 ....3.45
S.SanFran.,Cal. B3 ....4.20
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 ....3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....3.45
Atlanta A11 .....3.60
Johnstown,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Niles,Calif. P1 .....4.17
Pittsburgh(23) J5 .....3.45
Portland,Oreg. O4 .....4.20
SanFrancisco S7 .....4.00
Weirton,W.Va. W6 ....3.45

BAR SIZE ANGLES; H.R.CARBON

Bethlehem,Pa. B2 .....3.65

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....3.95
Buffalo R2 .....3.95
Canton,O. R2, T7 .....3.95
Clairton,Pa. C3 .....3.95
Ecorse,Mich. G5 .....4.25
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....3.95
Houston,Tex. S5 .....4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 .....3.95
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ..3.95
LosAngeles B3 .....5.00
Massillon,O. R2 .....3.95
Midland,Pa. C18 .....3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 ...3.95
Struthers,O. Y1 .....3.95
Warren,O. C17 .....3.95
Youngstown C3 .....3.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 .....4.20
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....4.20
Youngstown C3 .....4.20

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.20
Atlanta A11 .....5.35
Bessemer,Ala. T2 .....5.20
Bethlehem,Pa. B2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland R2 .....5.20
Ecorse,Mich. G5 .....5.40
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....6.25
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
LosAngeles B3 .....5.90
Pittsburgh J5 .....5.20
So.Duquesne,Pa. C3 ....5.20
So.SanFrancisco B3 ....5.95
Struthers,O. Y1 .....5.20
Youngstown C3 .....5.20

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 .....4.15
Ambridge,Pa. W18 ....4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 .....4.15
Camden,N.J. P13 .....4.60
Carnegie,Pa. C12 .....4.15
Chicago W18 .....4.15
Cleveland A7, C20 ....4.15
Detroit P17 .....4.30
Donora,Pa. A7 .....4.15
Ecorse,Mich. G5 .....4.35
Elyria,O. W8 .....4.15
FranklinPark,Ill. N5 ...4.15
Gary,Ind. R2 .....4.15
Hammond,Ind. L2, M13.4.15
Hartford,Conn. R2 ....4.55
Harvey,Ill. B5 .....4.15
LosAngeles R2 .....5.55
Mansfield,Mass. B5 ....4.55
Massillon,O. R2, R8 ....4.15
Midland,Pa. C18 .....4.15
Monaca,Pa. S17 .....4.15
Newark,N.J. W18 .....4.55
Plymouth,Mich. P5 ....4.40
Pittsburgh J5 .....4.10
Putnam,Conn. W18 ....4.55
Readville,Mass. C14 ...4.55
St.Louis,Mo. M5 .....4.55
So.Chicago,Ill. W14 ....4.15
SpringCity,Pa.(5) K3 ...4.55
Struthers,O. Y1 .....4.15
Waukegan,Ill. A7 .....4.15
Youngstown F3, Y1 ....4.15

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 .....4.90
Ambridge,Pa. W18 ....4.90
BeaverFalls,Pa. M12 ...4.90
Bethlehem,Pa. B2 .....4.90
Buffalo B5 .....4.90
Canton,O. R2, T7 .....4.90
Carnegie,Pa. C12 .....4.90
Chicago W18 .....4.90
Cleveland A7, C20 ....4.90
Detroit P17 .....5.05
Donora,Pa. A7 .....4.90
Elyria,O. W8 .....4.90
Gary,Ind. R2 .....4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 .....5.20
Harvey,Ill. B5 .....4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 ....5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 .....4.90
Monaca,Pa. S17 .....4.90
Newark,N.J. W18 .....5.20
Plymouth,Mich. P5 ....5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 .....4.90
Warren,O. C17 .....4.90
Waukegan,Ill. A7 .....4.90
Worcester,Mass. A7 ....5.20
Youngstown F3, Y1 ....4.90

RAIL STEEL BARS

ChicagoHts.(3) I-2 ..... 3.75
ChicagoHts.(4) I-2 ..... 3.45
ChicagoHts.(3) C-2 ..... 4.00
Dallas,Tex.(4) S20 ..... 6.00
Franklin,Pa.(3) F5 ..... 4.00
FortWorth,Tex.(26) T4 ..4.63
Huntngtn,W.Va.(3) W7.4.00
Marion,O(3) P11 .....3.70
Moline,Ill.(3) R2 .....3.55
Williamsport(3) S19 ...4.25

BARS, Wrought Iron

Economy,Pa.(S.R.) B14.8.60
Economy,Pa.(D.R.)B14 11.00
Economy(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 ..12.25
Mck.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ..11.25
Mck.Rks.(Staybolt) L5.12.75

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ...3.45
Alton,Ill.(6) L1 .....3.45
Atlanta A11 .....3.60
Buffalo R2 .....3.45
Cleveland R2 .....3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 ....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 ....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.70
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.17
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
SandSprings,Okla. S5 ..4.35
Seattle B3, N14 .....4.20
So.Chicago,Ill. R2 ....3.45
So.Duquesne,Pa. C3 ....3.45
So.SanFrancisco B3 ....4.20
SparrowsPoint,Md. B2 ..3.45
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Youngstown C3, R2 ....3.45

BARS, Reinforcing

(Fabricated; to Consumers)

Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ....4.35
LosAngeles B3 .....5.00
Marion,O. P11 .....4.75
Seattle B3, N14 .....5.10
So.SanFrancisco B3 ....5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 .....3.35
Cleveland J5, R2 .....3.35
Conshohocken,Pa. A3 ...3.60
Detroit M1 .....4.15
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.25
Gary,Ind. C3 .....3.35
Geneva,Utah G1 .....3.45
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 .....3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 .....3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ....3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 .....3.35
Weirton,W.Va. W6 ....3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 .....4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 .....4.15
Niles,O. N12 .....4.10
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14 ga., heavier) High-strength Low-Alloy

Cleveland J5, R2 ....5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 .....5.25
Fairfield,Ala. T2 .....5.05
Fontana,Calif. K1 ....6.74
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2, Y1.5.05
Irvin,Pa. C3 .....5.05
Lackawanna(35) B2 ..5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.05
So.Chicago,Ill. C3 ....5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 ....5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ....6.20
Ecorse,Mich. G5 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, Y1.6.20
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ....6.20
Pittsburgh J5 .....6.20
SparrowsPoint(38) B2..6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 ....6.20
Youngstown Y1 .....6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky. (8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo, Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles, O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin,Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

BLUED STOCK, 29 Ga.

Yorkville,O. W10	6.00

SHEETS, Culvert	Cu	Cu
No. 16	Alloy	Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45
Fairfield,Ala. T2	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Wrought Iron	An'l	Galv.
Apollo,Pa. B14	12.00	15.50

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Well Casing

Fontana,Calif. K1	4.80

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	...
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	...	...	...
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.20	14.70
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Ind.Harbor I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10.	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11	5.10
Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	5.70
Sharon,Pa. S3	4.95
So.SanFrancisco(25) B3	5.70
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.25
Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.50
Buffalo(27) R2	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.50
Conshohocken,Pa. A3	3.50
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.50
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.50
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.50
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Fontana,Calif. K1	11.15
Harrison,N.J. C18	9.50
NewBritn.Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	*4.50*	*5.95*	*6.55*	*8.50*	*10.80*
Bristol,Conn. W1	...	...	6.85	8.80	...
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.50	6.10	6.70	8.65	...
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	*4.50*	*5.95*	*6.55*	*8.50*	*10.80*
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	...
NewCastle,Pa. E5	4.50	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve-or-Pitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.50	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.15	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.50
Berea,O. C7	5.60
Bridgeprt,Conn.(10) S15	4.50
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.75
Detroit D2	4.75
Detroit M1	4.95
Dover,O.(40) G6	4.50
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.50
Fontana,Calif. K1	5.75
FranklinPark,Ill. T6	4.50
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.85
Mattapan,Mass. T6	5.00
Middletown, O. A10	4.15
New Britain(10) S15	4.50
NewCastle,Pa. B4	4.50
NewCastle,Pa.(40) E5	4.50
NewHaven,Conn. D2	5.00
NewHaven,Conn. A7	4.65
NewYork W3	5.00
Pawtucket,R.I. R3	5.15
Pawtucket,R.I.(21) N8	5.00
Riverdale,Ill. A1	4.50
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.50
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	5.00
Warren,O.(40) T5	4.50
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, (40)	4.50
Youngstown Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Dover,O. G6	4.50
Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac.Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.40
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	3.65
Youngstown C3	3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass.(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Williamsport,Pa. B2	6.00
Worcester A7,J4,T6,W12	6.20
Worcester,Mass. N6	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	6.00
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Woukegan,Ill. A7	8.45
Worcester,Mass. A7,T6	8.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.55
Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20, R2	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-Sga. I-1	5.15
No. Tonawanda B11	4.50
Palmer, Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7	4.80
Worcester,Mass. T6	4.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.15
Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy.Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	Stone	Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Bartonville,Ill. K4	126
Crawfordsville M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	*125*
Duluth A7	116
Franklin,Pa. F5	*125*
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Marion,O. P11	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	130

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116
Sterling,Ill.(1) N15	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

AXLES

Ind.Hardor,Ind. S13	5.25
Johnstown,Pa. B2	5.25

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

NAILS & STAPLES, Stock To dealers & Mfrs. (7) Col.

AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	111
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	9.10
Pittsburgh O3, P14	9.10
Seattle B3	9.35

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	4.00

Key to Producing Companies

M1	McLouth Steel Corp.	P12	Portsmouth Division, Detroit Steel Corp.
M4	Mahoning Valley Steel	P13	Precision Drawn Steel
M5	Medart Co.	P14	Pitts. Screw & Bolt Co.
M6	Mercer Tube & Mfg. Co.	P15	Pittsburgh Metallurgical
M8	Mid-States Steel & Wire	P16	Page Steel & Wire Div., Amer. Chain & Cable
M9	Midvale Co.	P17	Plymouth Steel Co.
M10	Missouri-Illinois Furnace	R1	Reeves Steel & Mfg. Co.
M12	Moltrup Steel Products	R2	Republic Steel Corp.
M13	Monarch Steel Co.	R3	Rhode Island Steel Corp.
M14	McInnes Steel Co.	R5	Roebling's Sons, John A.
N2	National Supply Co.	R6	Rome Strip Steel Co.
N3	National Tube Co.	R7	Rotary Electric Steel Co.
N5	Nelson Steel & Wire Co.	R8	RelianceDiv.,EatonMfg.
N6	New Eng.HighCarb.Wire	S1	Seneca Wire & Mfg. Co.
N8	Newman-Crosby Steel	S3	Sharon Steel Corp.
N12	Niles Rolling Mill Co.	S5	Sheffield Steel Corp.
N14	Nrthwst. Steel Roll.Mills	S6	Shenango Furnace Co.
N15	Northwestern S.&W. Co.	S7	Simmons Co.
N16	New Delphos Mfg. Co.	S8	Simonds Saw & Steel Co.
O3	Oliver Iron & Steel Corp.	S9	Sloss-Sheffield S.&I. Co.
O4	Oregon Steel Mills	S13	Standard Forgings Corp.
P1	Pacific States Steel Corp.	S14	Standard Tube Co.
P2	Pacific Tube Co.	S15	Stanley Works
P4	Phoenix Iron & Steel Co.	S16	Struthers Iron & Steel
P5	Pilgrim Drawn Steel	S17	Superior Drawn Steel Co.
P6	Pittsburgh Coke&Chem.	S18	Superior Steel Corp.
P7	Pittsburgh Steel Co.	S19	Sweet's Steel Co.
P9	Pittsburgh Tube Co.	S20	Southern States Steel
P11	Pollak Steel Co.	T2	Tenn. Coal, Iron & R.R.
		T3	Tenn. Prod. & Chem.
		T4	Texas Steel Co.
		T5	Thomas Steel Co.
		T6	Thompson Wire Co.
		T7	Timken Roller Bearing
		T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
		U1	Ulster Iron Works
		U4	Universal Cyclops Steel
		V2	Vanadium Alloys Steel
		V3	Vulcan Crucible Steel Co.
		W1	Wallace Barnes Co.
		W2	Wallingford Steel Co.
		W3	Washburn Wire Co.
		W4	Washington Steel Corp.
		W6	Weirton Steel Co.
		W7	W. Va. Steel & Mfg. Co.
		W8	West.Auto.Mach.Screw
		W9	Wheatland Tube Co.
		W10	Wheeling Steel Corp.
		W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
		W13	Wilson Steel & Wire Co.
		W14	Wisconsin Steel Div., International Harvester
		W15	Woodward Iron Co.
		W16	Worth Steel Co.
		W18	Wyckoff Steel Co.
		Y1	Youngstown Sheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50-31.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, T7, U4, V2, V3

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (¼" bar, elec. furn. billet, 5.03c); to consumers, 5.28c.
(27) Bar mill sizes.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.75c. 0.035" and heavier.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	36.5	34.5	33.5	5.5	3.5	5.5
¼	6.0	0.42	33.5	31.5	30.5	5.5	3.5	6.5
⅜	6.0	0.57	29.0	27.0	26.0	0.5	+1.5	2.5
½	8.5	0.85	40.5	38.5	39.5	21.0	19.0	20.0
¾	11.5	1.13	43.5	41.5	42.5	25.0	23.0	24.0
1	17.0	1.68	46.0	44.0	45.0	28.0	26.0	27.0
1¼	23.0	2.28	46.5	44.5	45.5	28.5	26.5	27.5
1½	27.5	2.73	47.0	45.0	46.0	29.0	27.0	28.0
2	37.0	3.68	47.5	45.5	46.5	29.5	27.5	28.5
2½	58.5	5.82	48.0	46.0	47.0	30.0	28.0	29.0
3	76.5	7.62	48.0	46.0	47.0	30.0	28.0	29.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 points lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N.3; Youngstown, plus 43% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1.

Column D: Etna, Pa. N2; Monaca, Pa. quotes 1 pt lower on ⅛" through 3", P9; Sharon, Pa. M6, quotes 1 pt lower on ⅛", 1 pt higher on ⅜" and 1 pt lower on ½" through 3"; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., W10 except 3½ pts lower on ⅛", 2½ pts lower on ¼", 3 pts lower on ⅜" Wheatland, Pa., except 2 pts lower on ⅛", ¼" and ⅜"; W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 24.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 8 pts lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Seamless— Black A	Galv. B	—Elec. Weld— Black C	Galv. D
2	37.0c	3.68	36.0	17.5	36.0	17.5
2½	58.5	5.82	39.0	20.5	39.0	20.5
3	76.5	7.62	39.0	20.5	39.0	20.5
3½	92.0	9.20	41.0	22.5	41.0	22.5
4	$1.09	10.89	41.0	22.5	41.0	22.5
5	1.48	14.81	41.0	22.5	41.0	22.5
6	1.92	19.18	41.0	22.5	41.0	22.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, N3; Youngstown, Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	—Elec. Weld— H.R.	C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding	—Plates— Carbon Base		—Strip— Cold-Rolled Carbon Base		—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
Stainless	10%	20%	10%	Both Sides			
302	....	....	....	....	19.75	21.50–24.00	75.00
304	23.50	26.50–28.00	....	....	20.75–23.50	22.50–25.5	77.00
305	....	....	....	....	....	....	79.00
309	29.00	33.50	....	....	....	....	....
310	35.00	39.50	....	....	....	....	105.00
316	28.00	31.00–32.50	....	....	26.00	28.00–34.5	....
317	33.00	37.50	....	....	....	....	....
318	32.00	36.50	....	....	....	....	....
321	25.00	29.50	....	....	23.00	25.00	90.00
347	26.00	29.00–30.50	....	....	24.00	26.00–31.5	94.00
405	19.75	26.25	....	....	....	....	....
410	19.25	25.75	....	....	....	....	....
430	19.25	25.75	....	....	....	....	....
Nickel	31.00	41.00	33.50	45.00	....	....	88.00
Inconel	39.00	51.00	....	....	....	....	140.00
Monel	32.00	42.00	....	....	....	....	83.00
Copper*	....	....	21.45†	27.15†	....	....	....

* Deoxidized. † 17.95c for hot-rolled. ‡23.90c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ⅞-in. 29
- 1-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:
- ½-in. and smaller 25
- ⅝-in. & ⅞-in. 23
- 1-in.-1½-in. 23
- 1⅝ in. and larger 16

H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅞-in..	28	25
1-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16

C.P. Hex:		
½-in. & smaller	33	29
⅝-in. & ⅞-in..	30	27
1-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy.	Reg.	Lght.
	35	41	41
⅝-in. & ⅞-in.	30	36	36
1-in.-1½-in. .	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. .. 50
- ¾-in. through 1 in. ... 43

Longer than 6 in.:
- ¼-in. through ⅝-in. .. 33
- ¾-in. through 1 in. ... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger 24
N.F. thread, all diams... 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
7/8-in., under .....43 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....List to 50c off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	39.00	32.00	30.00
302...	39.00	34.50	30.00
303...	41.00	38.00	32.50
304...	41.00	36.50	31.50
309...	53.50	52.50	43.00
316...	54.50	56.50	47.50
321...	47.00	46.00	35.50
347...	51.50	50.00	40.00
410...	34.50	28.50	24.50
416...	35.00	35.00	25.00
420...	42.00	45.00	30.00
430...	37.00	29.00	25.00
501...	25.50	24.00	13.00
502...	26.50	25.00	14.00

Baltimore, Types 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416, S18.

Cleveland, strip A7.

Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.

Dunkirk, N.Y., bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Harrison, N. J., Types 302, 304, 316 wire and strip D6.

Massillon, all products R2.

McKeesport, Pa., bars; sheets except Type 416 C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip C4.

So. Chicago, Ill., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 59.50c, strip 61.50c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & Wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-32.00
Toluol, one deg...21.00-28.00
Industrial xylol ..21.00-29.50
Per ton bulk, ovens
Sulphate of ammonia.$32-45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25
Do., less than carlots..18.00
Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $39; less than 60%, $36.

Imported, net ton, duty paid, metallurgical grade, $28-$29.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge Iron: Cents
- 98+% Fe, carlots.. 15.00
- Swedish, c.i.f. New York, in bags....7.40-8.50

Electrolytic Iron:
- Annealed, 99.5% Fe 39.50
- Unannealed, 99+% Fe 33.50
- Unannealed 99+% Fe(minus 325 mesh) 48.50

Powder Flakes 44.50

Carbonyl Iron:
- 97.9-99.8%, size 5 to 10 microns..70.00-135.00

Aluminum:
- Carlots, freight allowed 27.00
- Atomized, 500 lb drums, freight allowed 30.00

Brass, 10-ton lots.28.50-31.25

Copper:
- Electrolytic 33.75
- Reduced 33.50

Lead 20.50

Manganese:
- Minus 100-mesh 52.00
- Minus 35 mesh 48.00
- Minus 200 mesh.... 56.00

Nickel unannealed ... 75.50

Nickel-Silver, 10-ton lots 41.75

Silicon 34.00

Solder (plus cost of metal) 8.50

Stainless Steel, 302 ... 75.00

Tin $1.20

Zinc, 10-ton lots.20.50-28.00

Tungsten: Dollars
- 99%, minus 80 to 200 mesh, freight allowed: over 1000 lb ..... 2.90; 1000 lb ..... 2.95; less than 1000 lb. 3.00
- 98.8% minus 65 mesh, freight allowed: 1000 lb and over... 2.90; less than 1000 lb.. 3.00

Molybdenum:
- 99%, minus 80 to 200 mesh, over 500 lb ..... 2.25; 200 to 500 lb ..... 2.60; less than 200 lb .. 2.75
- 82-88%, freight allowed, 2000 lb and over .. 2.40; less than 2000 lb.. 2.45

Chromium, electrolytic 99% Cr min. 3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll.fur. .$14.00-14.50
Connellsvll.fdry. 16.00-17.00
New River, foundry ...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
- New England, del...‡23.40

Chicago, ovens 21.00
- Chicago del. .....†22.45
- Detroit, del. 24.91

Terre Haute, ovens ...21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
- Chicago, del. 24.12
- Cincinnati, del. 23.67
- Detroit, del. 24.65

Ironton, O., ovens 20.40
- Cincinnati, del. 22.71

Painesville, O., ovens..21.90
- Buffalo, del. 24.02
- Cleveland, del. 23.62
- Erie, del. 22.04

Birmingham, ovens ...19.15
- Birmingham, del. ...20.20

Philadelphia, ovens ...21.25
Neville Island, Pa., ovens 22.00
Swedeland, Pa., ovens..21.20
St. Louis, ovens 22.99
- St. Louis, del. 24.12

Portsmouth, O., ovens..20.15
- Cincinnati, del. 22.71

Detroit, ovens 21.65
- Detroit, del. *22.65
- Buffalo, del. 24.69
- Flint, del. 24.09
- Pontiac, del. 23.04
- Saginaw, del. 24.40

Includes representative switching charge of: *, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York(city)	5.82	6.84	7.84	6.14	...	5.97	6.64	8.60	5.95	6.18	7.64
New York(c'try)	5.52	6.64	7.54	5.84	...	5.67	6.44	8.40	5.65	5.88	7.34
Boston (city) ..	5.95	6.75	7.89	5.90	...	5.80	6.39	8.70	5.95	6.58	7.48
Boston (c'try) .	5.75	6.55	7.69	5.70	...	5.60	6.19	8.50	5.75	6.38	7.28
Phila. (city) ..	6.60-6.70	6.75	7.20	5.90	...	5.85	6.46	8.40	5.70	5.90	7.00
Phila. (c'try) ..	6.35-6.45	6.50	6.95	5.65	...	5.60	6.21	8.15	5.45	5.65	6.75
Balt. (city) ...	5.35	6.59	6.77	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.57	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va..	5.55	...	6.80	5.83	...	5.73	6.30	...	5.83	5.65	7.33
Wash. (w'hse) .	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††[5]	5.55	5.85	7.15
Buffalo (w'hse).	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††[5]	5.35	5.65	6.95
Pitts. (w'hse)..	5.15	5.95*	6.70-6.95	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse)	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††[5]	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.50	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse).	5.15	5.95	7.30	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city) ..	5.57	6.14	6.54	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	7.15	5.30	...	5.30	5.85	9.75††[5]	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.95	5.10	...	5.10	5.65	9.55††[5]	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	7.29	5.44	...	5.44	6.09	9.89††[5]	5.59	5.74	6.94
Milwau. (c'try).	5.29	6.09	7.09	5.24	...	5.24	5.89	9.69††[5]	5.39	5.54	6.74
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[5]	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[5]	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[3]	5.25	...	5.25	6.88	...	5.40	5.55	7.83
Birm'hm(w'hse)	5.15	5.95	6.15[3]	5.10	...	5.10	...	...	5.25	5.40	...
Los Ang. (city)	6.10	7.65	7.90	6.15	8.90	6.10	7.75	...	6.10	6.20	8.40
L. A. (w'hse)..	5.90	7.45	7.70	5.95	8.70	5.90	7.55	...	5.90	6.00	8.20
San Francisco .	6.50[9]	7.60[3]	7.50[3]	7.45[9]	8.25[3]	6.30[9]	7.55	...	6.30[9]	6.40[9]	8.50[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $68; chemical-bonded chrome brick, $72; magnesite brick, $94; chemical-bonded magnesite, $83.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Bonne Terre, Mo., Blue Bell, Williams, Millville, W. Va., Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Mo., $12.45; Martin, Millersville, Narlo, Clay Center, and Bettsville, O., Billmeyer, Plymouth Meeting, Pa., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Chinese	$29.00-$30.00
Brazilian	29.00-30.00
Bolivian	29.00-30.00
Domestic scheelite, del.	32.00

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $70, Palmerton, Pa.; $71, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces, $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 29.75c; ton lot 31.25c; less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 139)

Upward Pressure Still on Prices

One producer and one importer of aluminum raise prices. A 24.5-cent price for electrolytically refined domestic copper becomes general

UPWARD pressure on prices of nonferrous metals continued last week. This brought about higher quotations on aluminum by one producer and one importer and a movement up to the 24.5-cent price for electrolytically refined copper by the two domestic producers that had been maintaining the old 22.5-cent price.

Alcoa's Aluminum Prices Up

The aluminum producer making the price increases was Aluminum Co. of America. It raised its base prices of standard commercial aluminum pig and ingot to 18 cents and 19 cents a pound, respectively. This is an increase of 1.5 cents a pound on each product, and was effective Sept. 25.

Increased cost of materials, labor and other services involved in the production and processing of aluminum necessitated the increases, the company says. Even after the increases the base price of aluminum ingot remains below the level of 1939, the company points out.

Adjusted prices of finished aluminum were to be announced as soon as new price sheets could be printed. All previous price schedules on fabricated products were withdrawn and the new schedule on the bulk of the products was to be effective Sept. 29.

Average increase in fabricated products is estimated to be 2.5 to 3 cents a pound. There is no single percentage increase throughout the range of fabricated products, as each item was to be adjusted to remedy disparities in narrowing profit margins. This has resulted in a wide range of upward price adjustments among the various products; the increases were said to average between 6 and 10 per cent.

The importer raising the price for aluminum ingots is Aluminum Import Corp., sales agency subsidiary in the United States for Aluminum Ltd. It increased its aluminum ingot price 1.5 cents a pound, making the new price 18 cents in U. S. currency, f.o.b. Canadian smelter. This price includes the U. S. import duty of 2 cents a pound and freight allowance east of the Mississippi river and north of the Mason-Dixon line.

Abandon 22.5-Cent Copper Price

A 24.5-cent price for electrolytically refined copper became general with announcement that Phelps Dodge Corp. and Kennecott Copper Corp., the two domestic producers that had been holding to a 22.5-cent price, were adopting the higher price. Phelps Dodge made its increase effective Sept. 26 and Kennecott's increase is effective Oct. 2.

Upward revisions in prices of copper and copper alloy products are continuing as fabricators make adjustments to the higher prices of refined copper.

Copper requirements remain heavy, and as a result demand for foreign copper is strong. The foreign supply has been lowered by a strike at Andes Copper Mining Co. in Chile.

Zinc Stockpiling Opposed

Discontent over further stockpiling of zinc is growing.

Heard increasingly is this question: When consumer demand for zinc is so great as it is now why should the government continue to enlarge its already big holdings of a metal on which the nation is not dependent on far distant countries for supply?

It has been pointed out that there was no scarcity of zinc during World War II. Although stocks at U. S. smelters were only about 17,500 tons at the time of Pearl Harbor they had risen to 259,000 tons by the end of 1945. The United States can readily supplement its zinc supply with zinc from Mexico and Canada.

Castings Shipments Increase

High rate of operations in the metalworking industry this year are reflected by increases in shipments of nonferrous castings (see accompanying chart) in the first seven months of this year over the corresponding period of 1949.

Copper and copper-base alloy castings shipments rose from 421,766,000 pounds in the first seven months of 1949 to 516,037,000 pounds in the first seven months of 1950; aluminum and aluminum-base alloy castings rose from 170,820,000 pounds to 233,246,000 pounds; and zinc and zinc-base alloy castings climbed from 204,366,000 pounds to 292,406,000 pounds, the U. S. Bureau of Census reports.

Increases were also shown by magnesium and magnesium-base alloy castings which rose from 5,506,000 pounds to 5,582,000 pounds and by lead and lead-base alloy castings which jumped from 4,172,000 pounds to 6,222,000 pounds.

Demand for Lead Eases

Consumer demand for lead has eased noticeably, although demand is said to still be larger than supply. Some producers report their output already has been sold out or earmarked through October.

Easing in demand for lead is attributed to a sharp improvement in the supply of scrap lead.

Vanadium Metal Offered

A high purity, ductile vanadium metal is now available in limited quantities for fabrication and use by the metalworking industry, the Electro Metallurgical Division of Union Carbide and Carbon Corp. announced.

The metal averages above 99.8 per cent vanadium and can be obtained in the form of ingots, bars, sheet, and foil. Also it can be obtained in the form of chips for remelting into ingots of special sizes and shapes.

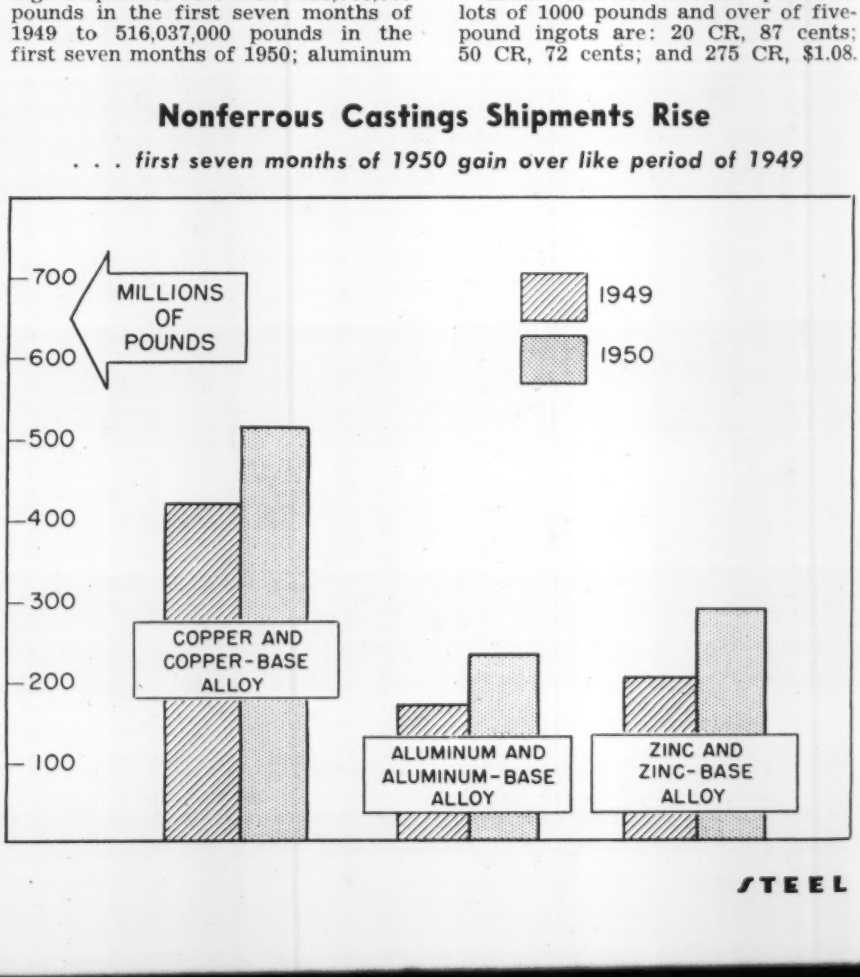
Beryllium Company Ups Prices

Beryllium Corp., Reading, Pa., increased prices last week on some of its alloy casting ingots.

Grades affected and new prices on lots of 1000 pounds and over of five-pound ingots are: 20 CR, 87 cents; 50 CR, 72 cents; and 275 CR, \$1.08.

Nonferrous Castings Shipments Rise

. . . first seven months of 1950 gain over like period of 1949



NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 22.50-24.50c, Conn. Valley; Lake 24.62½c, delivered.
Brass Ingot: 85-5-5-5 (No. 115) 25.50c; 88-10-2 (No. 215) 35.00c; 80-10-10 (No. 305) 29.50c; No. 1 yellow (No. 405) 21.75c.
Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.60c, delivered.
Lead: Common 15.80c; chemical 15.90c; corroding 15.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 17.50-19.00c, pigs 16.50-19.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.
Secondary Aluminum: Piston alloys 26.00-27.00c; No. 12 foundry alloy (No. 2 grade) 26.00-26.50c steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 26.50-27.50c; grade 2 25.50-26.50c; grade 3, 25.00-26.00c; grade 4, 24.50-25.50c. Prices include freight at c.l. rate up to 75 cents per 100 lb.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 22.50c, f.o.b. Freeport, Tex.
Tin: Grade A, prompt 103.00c, October 102.50c, November-December 102.25c.
Antimony: American 99-99.8% and over but not meeting specifications below 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%; Chinese nom.; English, nom.; Belgian, 28.50c, duty paid, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.
Mercury: Open market, spot, New York $87-$93 per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $30.00 per lb contained Be, f.o.b., Cleveland and Reading, Pa.
Cadmium: "Regular" straight or flat forms, $2.40 del.; special or patented shapes, $2.55.
Cobalt: 97-99%, $1.80 per lb for 500 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 72.75c per oz.
Platinum: $100-103 per ounce from refineries.
Palladium: $24 per troy ounce.
Iridium: $220 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 39.43; yellow brass 36.53; commercial bronze, 95%, 39.43; 90%, 39.03; red brass, 85% 38.11; 80%, 37.72; best quality, 37.32; nickel silver, 18%, 50.24; phosphor-bronze, grade A, 5% 58.02.
Rods: Copper, hot-rolled 35.28; cold-drawn 36.53; yellow brass free cutting, 30.95; commercial bronze, 95% 39.12; 90% 38.72; red brass 85% 37.80; 80% 37.41.
Seamless Tubing: Copper 39.47; yellow brass 39.54; commercial bronze 90% 41.69c; red brass 85% 41.02; 80% 40.63.
Wire: Yellow brass 36.82; commercial bronze, 95% 39.72; 90% 39.32; red brass, 85% 38.40; 80% 38.01; best quality brass 37.61.
Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 26.67-28.67, l.c.l. 27.17-29.17, 100,000 lb lots 26.545-28.545; weatherproof, f.o.b. eastern mills, c.l. 28.10-29.60, l.c.l. 28.60-30.10, 100,000 lb lots 27.85-29.35; magnet, del., 15,000 lb or more 32.50-34.50, l.c.l. 33.25-35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)
Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	...	...
0.135-0.096	12-48	27.9	...	...
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.
Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $21.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils $21.00 per cwt. Traps and bends: List prices plus 60%

ZINC

Sheets, 23.50-23.75c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 22.50-23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 21.50-22.00c; over 12-in., 22.50-23.00c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 77.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b mill)

Sheets, cold-rolled 53.00c. Strip cold-rolled 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb. 55.00-59.00c; 25 to 99 lb. 45.00-49.00c; 100 lb to 5000 lb, 38.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.
Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 34.09c; oval 33.59c; cast 32.12c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 53.90c, under 1000 lb 55.90c, f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, nom.; over 200 lb, nom., f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 65.00c; 10,000 to 30,000 lb, 63.00c; 3000 to 10,000 lb, 67.00c, 500 to 3000 lb, 68.00c; 100 to 500 lb, 70.00c; under 100 lb, 73.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 29.50c; 400-lb bbl. 27.50c up to 10,000 lb, 27.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100 lb drums, less than 10 drums 46.8c, 10 or more drums 44.8c, f.o.b. Niagara Falls, N. Y.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.25	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red brass			
85%	20.25	20.00	19.50
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel, silver, 10%	21.25	21.00	10.625
Phos. bronze, A	22.625	22.375	21.375

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; composition red brass 18.75; radiators 15.50; heavy yellow brass 14.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; refinery brass (60% copper) per dry copper content 20.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 20.25-20.50; No. 2 19.25-19.50; light copper 17.75-18.00; No. 1 composition red brass 16.25-16.50; No. 1 composition turnings 16.75-17.00; mixed brass turnings 10.50-10.75; new brass clippings 16.50-16.75; No. 1 brass rod turnings 15.25-15.50; light brass 10.50-10.75; heavy yellow brass 11.25-11.50; new brass rod ends 15.50-15.75; auto radiators, unsweated 13.75-14.00; cocks and faucets, 14.75-15.00; brass pipe 15.75-16.00.
Lead: Heavy 13.25-13.50; battery plates 8.25-8.50; linotype and stereotype 14.50-14.75; electrotype 12.75-13.00; mixed babbitt 12.25-12.50.
Zinc: Old zinc 11.00-11.25; new die cast scrap 10.75-11.00; old die cast scrap 8.00-8.25.
Tin: No. 1 pewter 55.00-57.00; block tin pipe 75.00-77.00; No. 1 babbitt 50.00-52.00.
Aluminum: Clippings 2S nom.; old sheets 12.00-12.50; crankcase nom; borings and turnings nom.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. 28	22.50-24.50	15.80	17.50	103.00	17.50-19.00	32.00	48.00	72.75
Sept. 27	22.50-24.50	15.80	17.50	103.50	17.50-19.00	32.00	48.00	72.75
Sept. 25-26	22.50-24.50	15.80	17.50	104.00	17.50-19.00	32.00	48.00	72.75
Sept. 22-23	22.50-24.50	15.80	17.50	103.50	17.50	32.00	48.00	72.75
Sept. 21	22.50-24.50	15.80	17.50	103.00	17.50	32.00	48.00	72.75
Sept. 20	22.50-24.50	15.80	17.50	102.50	17.50	32.00	48.00	72.75
Sept. 18-19	22.50-24.50	15.80	17.50	101.00	17.50	32.00	48.00	72.75
Sept. 14-16	22.50-24.50	15.80	17.50	103.00	17.50	32.00	48.00	72.75
Sept. 13	22.50-24.50	15.80	17.50	102.00	17.50	32.00	48.00	72.75
Sept. 12	22.50-24.50	15.80	17.50	101.25	17.50	32.00	48.00	72.75
Sept. 11	22.50-24.50	15.80	17.50	100.50	17.50	32.00	48.00	72.75
Sept. 8-9	22.50-24.50	15.80	17.50	99.00	17.50	28.50	48.00	72.75
Sept. 7	22.50-24.50	14.80	17.50	99.00	17.50	28.50	48.00	72.75
Sept. 6	22.50-24.50	14.80	15.00	97.50	17.50	28.50	48.00	72.75
Sept. 5	22.50-24.50	14.80	15.00	95.50	17.50	28.50	48.00	72.75
Sept. 1-2	22.50-24.50	14.80	15.00	97.50	17.50	28.50	48.00	72.75
Aug. Avg.	22.870	12.726	15.00	102.12	17.50	24.648	48.00	72.75
Aug. 31	22.50-24.50	13.80	15.00	98.50	17.50	28.50	48.00	72.75
Aug. 30	22.50-24.50	13.80	15.00	99.50	17.50	24.50	48.00	72.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers commissions, as reported to STEEL, Sept. 28, 1950; gross tons
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Sept. 28	$41.00
Sept. 21	40.58
Aug. 1950	40.00
Sept. 1949	26.07
Sept. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	**$44.00**
No. 2 Heavy Melt.	**41.00**
No. 1 Bushelling	**44.00**
No. 1 Bundles	**44.00**
No. 2 Bundles	39.00
Heavy Turnings	**43.00-44.00**
Machine Shop Turnings	33.00-34.00†
Mixed Borings, Turnings	33.00-34.00†
Short Shovel Turnings	*38.00*
Cast Iron Borings	35.50-36.00
Low Phos. Steel	48.00-49.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
No. 1 Machinery Cast.	**50.00-51.00**
Charging Box Cast	**43.00-44.00**
Heavy Breakable Cast.	**41.00-42.00**

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.00
Rails, Random Lengths	49.50-50.00
Rails, 2 ft. and under.	52.50-53.50
Rails, 18 in. and under	53.00-54.00
Railroad Specialties	52.50-53.00

† Crushers' buying prices.
* Nominal.

CLEVELAND

(Delivered Consuming Plant)

No. 1 Heavy Melt. Steel	$42.50-43.50
No. 2 Heavy Melt. Steel	37.00-37.50
No. 1 Busheling	42.50-43.50
No. 1 Bundles	42.50-43.50
No. 2 Bundles	31.00-32.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	32.50-33.50
Short Shovel Turnings	33.00-33.50
Cast Iron Borings	33.00-33.50
Low Phos.	46.00-47.00

Cast Iron Grades

No. 1 Cupola	52.00-53.00
Charging Box Cast	46.00-47.00
Stove Plate	44.00-45.00
Heavy Breakable Cast	43.00-44.00
Unstripped Motor Blocks	36.00-37.00
Brake Shoes	40.00-41.00
Clean Auto Cast	54.00-55.00
No. 1 Wheels	46.00-47.00
Burnt Cast	41.00-42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00
R.R. Malleable	60.00-62.00
Rails, 3 ft and under..	61.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, Random Lengths	56.00-58.00
Cast Steel	48.00-49.00
Railroad Specialties	49.00-50.00
Uncut Tires	54.00-56.00
Angles, Splice Bars	57.00-59.00

VALLEY

No. 1 Heavy Melt. Steel	**$43.50-44.00**
No. 2 Heavy Melt. Steel	**39.50-40.00**
No. 1 Bundles	43.50-44.00
Facty. Prod. Bundles..	43.50-44.00
No. 2 Bundles	**34.00-34.50**
Machine Shop Turnings.	**34.00-34.50**
Short Shovel Turnings.	**36.00-36.50**
Cast Iron Borings	**36.00-36.50**
Low Phos.	46.00-46.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$39.00*
No. 2 Heavy Melt. Steel	*36.00*
No. 1 Busheling	*38.00*
No. 1 Bundles	*39.00*
No. 2 Bundles	*32.00*
Short Shovel Turnings	*33.00*
Machine Shop Turnings	27.50-28.00
Mixed Borings, Turnings	*27.00*
Low Phos. Punchings and Plate, elec. fur. grade	45.00-46.00
Low Phos. Plate, 5 ft & Under	45.00-46.00
Elec. Furnace Bundles.	41.00-42.00
Heavy Turnings	*39.00*
No. 1 Chemical Borings	39.00
Knuckles and couplers.	47.00-47.50
Steel car wheels	46.00-47.00

Cast Iron Grades

No. 1 Cupola Cast	*42.00-43.00*
No. 1 Machinery Cast	*46.00-48.00*
No. 1 Yard Cast	*40.00-42.00*
Charging Box Cast	*40.00-42.00*
Heavy Breakable Cast	*40.00-42.00*
Clean Auto Cast	46.00
No. 1 Wheels	*50.00*
Malleable	52.00-53.00

CINCINNATI

No. 1 Heavy Melt. Steel	*$42.00*
No. 2 Heavy Melt. Steel	*37.00*
No. 1 Busheling	*42.00*
No. 1 Bundles	*42.00*
No. 1 Black Bundles	*37.00*
No. 3 Bundles	*27.00*
Machine Shop Turnings	*26.00*
Short Shovel Turnings	*29.00*
Mixed Borings, Turnings	*28.00*
Cast Iron Borings	*29.00*

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	*48.00*
Stove Plate	*39.00*
Heavy Breakable Cast	*45.00*
Unstripped Motor Blocks	*34.00*
Brake Shoes	31.00
Clean Auto Cast	55.00
Drop Broken Cast	57.50
Low Phos., 18 in. and under	53.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*46.00*
R.R. Malleable	*55.00*
Rails, Rerolling	*55.00*
Rails, Random Lengths	*54.00*
Rails, 18 in. and under	*62.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$30.00-31.00
No. 1 Bundles	37.00-37.50
No. 2 Bundles	29.00-30.00
No. 1 Busheling	37.00-37.50
Machine Shop Turnings	25.00-25.50
Forge Flashings	37.00-37.50
Short Shovel Turnings.	27.00-27.50
Cast Iron Borings	27.00-27.50
Punchings & Plate Scrap	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	**42.00-43.00**
Heavy Breakable Cast.	**35.00-36.00**
Clean Auto Cast	**45.00-46.00**

BUFFALO

No. 1 Heavy Melt. Steel	$41.00-42.00
No. 2 Heavy Melt. Steel	38.00-38.50
No. 1 Busheling	38.00-38.50
No. 1 Bundles	*39.50-40.00*
No. 2 Bundles	36.00-36.50
Machine Shop Turnings	**30.00-30.50**
Mixed Borings, Turnings	**30.00-30.50**
Cast Iron Borings	**30.00-30.50**
Short Shovelings	**32.00-32.50**
Low Phos.	42.00-43.00

Cast Iron Grades

No. 1 Cupola	*41.50-42.00*
No. 1 Machinery	*44.50-45.00*
Malleable	*44.50-45.00*

Railroad Scrap

Rails, 2 ft. and under.	**49.00-50.00**
Rails, random size....	**44.00-45.00**
Railroad Specialties	**42.00-43.00**

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$34.50*
No. 2 Heavy Melt. Steel	*29.00-30.00*
No. 1 Busheling	*32.00-33.00*
No. 1 Bundles	*34.50*
No. 2 Bundles	**27.00-28.00**
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	*23.00-24.00*
Short Shovel Turnings	*25.00-26.00*
Punchings & Plate Scrap	**36.00-37.00**
Low Phos. Plate, 5 ft & under	**36.00-37.00**
Elec. Furnace Bundles.	**35.00-36.00**

Cast Iron Grades

No. 1 Cupola Cast	*34.00-35.00*
No. 1 Machinery	*36.00-37.00*
Charging Box Cast	*32.00-33.00*
Heavy Breakable	*32.00-33.00*
Unstripped Motor Blocks	*29.00-30.00*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	**$32.00**
No. 2 Heavy Melt. Steel	26.00-26.50
No. 1 Bundles	32.00
No. 1 Busheling	31.00-32.00
Machine Shop Turnings	**23.00-23.50**
Short Shovel Turnings	*25.00-25.50*
Mixed Borings, Turnings	*24.50-25.00*
Bar Crops and Plate	*38.00-39.00*
Punchings & Plate Scrap	*38.00-39.00*
Chemical Borings	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	*33.50-34.50*
Mixed Cast	*32.50-33.50*
Heavy Breakable Cast	*30.00-32.00*
Stove Plate	*32.00-32.50*

CHICAGO

No. 1 Heavy Melt. Steel	**$40.00**
No. 2 Heavy Melt. Steel	**38.00**
No. 1 Bundles	**40.00**
No. 2 Bundles	**34.00-35.00**
Machine Shop Turnings	*31.00-32.00*
Mixed Borings, Turnings	*31.00-32.00*
Short Shovel Turnings	*31.00-32.00*
Cast Iron Borings	*31.00-32.00*
Low Phos.	*47.00*
Elec. Furnace Bundles	40.00-41.00
Heavy Turnings	37.00-38.00
Cut Structurals	**44.00-45.00**

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
Clean Auto Cast	50.00-51.00
No. 1 Wheels	*39.00-40.00*
Stove Plate	*39.00-40.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00*
Malleable	56.00-57.00
Rails, Rerolling	*60.00-62.00*
Rails, Random Lengths	54.00-55.00
Rails, 2 ft and under..	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	53.00-54.00

* Nominal.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$34.50-35.50
No. 2 Heavy Melt. Steel	31.00-32.00
No. 1 Busheling	31.00-32.00
No. 2 Bundles	29.00-30.00
Machine Shop Turnings	**27.00-28.00**
Mixed Borings, Turnings	**23.00-24.00**
Short Shovel Turnings.	**27.00-28.00**
Cast Iron Borings	**27.00-28.00**
Bar Crops and Plate	**41.00-42.00**
Cut Structurals	**41.00-42.00**

Cast Iron Grades

No. 1 Cupola Cast	51.00-52.00
Stove Plate	46.50-47.50
No. 1 Wheels	**37.00-38.00**

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00
R.R. Malleable	**nominal**
Rails, Rerolling	**48.00-49.00**
Rails, 3 ft and under..	**48.00-49.00**
Angles and Spice Bars	**47.00-48.00**

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	36.00-37.00
No. 1 Bundles	39.00-40.00
No. 2 Bundles	34.00-35.00
Machine Shop Turnings	27.00-28.00
Short Shovel Turnings.	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	*47.00-48.00*
Charging Box Cast	39.00-40.00
Heavy Breakable Cast	*40.00-42.00*
Brake Shoes	44.00-45.00
Clean Auto Cast	*46.00-48.00*
Burnt Cast	38.00-39.00

Railroad Scrap

R.R. Malleable	*55.00-57.00*
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	51.00-53.00
Rails, 2 ft and under.	56.00-58.00
Uncut Tires	46.50-47.50
Angles, Splice Bars	*55.00-56.00*
Railroad Specialties	49.00-50.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$24.50*
No. 2 Heavy Melt. Steel	*22.50*
No. 1 Bundles	*26.50*
No. 2 Bundles	*24.50*
No. 3 Bundles	*19.50*
Machine Shop Turnings	*13.00*
Low phos, electric	*40.00*

Cast Iron Grades

No. 1 Cupola Cast	*45.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	23.50
Rails, Random Lengths	23.50

SEATTLE

No. 1 Heavy Melt. Steel	**$24.00**
No. 2 Heavy Melt. Steel	**24.00**
No. 1 Busheling	**21.50**
Nos. 1 & 2 Bundles	**22.00**
No. 3 Bundles	**18.00**
Machine Shop Turnings	**15.00**
Mixed Borings, Turnings	**15.00**
Punchings & Plate Scrap	**30.00-32.50**
Cut Structurals	**30.00-32.50**

Cast Iron Grades

No. 1 Cupola Cast	**30.00-35.00**
Heavy Breakable Cast..	**30.00**
Stove Plate	**25.00-27.50**
Unstripped Motor Blocks	**30.00**
Malleable	**30.00**
Brake Shoes	**30.00**
Clean Auto Cast	**35.00**
No. 1 Wheels	**32.50**

Railroad Scrap

No. 1 R.R. Heavy Melt	**25.00**
Railroad Malleable	**30.00**
Rails, Random Lengths	**26.00**
Angles and Splice Bars.	**25.00**

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	*$26.50*
No. 2 Heavy Melt. Steel	*24.50*
No. 1 Bundles	*26.50*
No. 2 Bundles	*22.50*
No. 3 Bundles	*17.50*
Machine Shop Turnings	12.00
Punchings & Plate Scrap	*35.50*

Cast Iron Grades

No. 1 Cupola Cast	*45.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*37.50*
Rails, Rerolling	39.50

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	**$30.00**
No. 1 Bundles	**30.00**
Mechanical Bundles	**28.00**
Mixed Steel Scrap	**28.00**
Mixed Borings, Turnings	**23.00**
Rails, Remelting	**30.00**
Rails, Rerolling	**33.00**
Busheling	**24.50**
Bushelings new factory, prep'd	**28.00**
Bushelings new factory, unprep'd	**23.00**
Short Steel Turnings	**23.00**

Cast Iron Grades

Cast	**40.00-43.00***

* F.o.b. shipping point.

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HONORABLE PAUL G. HOFFMAN
Administrator,
Economic Co-operation Administration

"If you are going to maintain private enterprise in the United States, you must have private savings. There is no substitute for them. If America ever loses the habit of thrift, and stops saving, the funds for private enterprise will cease."

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STEEL

Sheets, Strip . . .

Sheet and Strip Prices, Page 121 & 122

Philadelphia—Unable to appreciate what their position will be for first quarter distribution most producers are resisting considerable pressure to accept flat-rolled orders for that period. Some stainless has been booked, but signs point toward tighter allocations on that grade. Because of uncertainty over armament requirements, most producers are delaying setting up fourth quarter rolling schedules and are operating under shorter lead time than usual. Few mills have made up December programs. Allocations are about the same as for November.

Boston—Flat-rolled steel inventories, below excessive levels, are not likely to improve. There are exceptions to the trend toward shortages, and carryovers due to be shipped next quarter will mean more tonnage delivered in ratio to new firm orders taken. Shank steel and tack plate are in sufficient supply to meet more active shoe making. Stanley Works, Bridgeport, Conn. has advanced cold-rolled spring steel in heavier gages, 0.26 to 0.40 carbon, $7 ton to 4.50c, Pittsburgh.

New York—While some producers are booking stainless for first quarter, sheets and strip will eventually go under allocation for that period. Other mills are not booking any flat-rolled tonnage beyond December and in the case of stainless already have distributors on quotas. Nickel shortage, plus heavy demand, is tightening stainless. Further sharp reductions in galvanized supply are ahead. Pressure to place fourth quarter volume is easing. Most producers have set up schedules with a view to becoming current by Jan. 1. Few, if any, however, think they can make it with increasing armament needs to be met.

Pittsburgh—Full production schedules among nonintegrated sheet and strip producers are possible only through conversion semifinished supplied by customers. Integrated producers have substantially reduced customers' monthly allotments for fourth quarter. Military requirements gradually increase but most such tonnage comes out of customers' regular allotments.

Cleveland—Sheetmakers are entering fourth quarter with heavy carryovers and books loaded with orders that will carry into first quarter of 1951. Customers' quotas for last quarter have been reduced sharply. Further revisions may be necessary to accommodate any military orders that may arise. Current military requirements are described as only moderate but steady expansion in such orders is anticipated. With labor agitating for another wage increase talk is heard of a likely early increase in steel prices. Indications are, however, increases will be deferred until the wage question is settled.

Cincinnati—Reduction in tonnage for civilian sheet needs is apparent from schedules adopted for part of fourth quarter. Military orders are small but the volume is growing.

Chicago—Despite a few military orders requiring sizable tonnages of sheets, landing mats and blitz cans for example, mills are pouring most of their tonnage into normal civilian goods and are beseiged for more. Indications are within the next week or two a few large sheet consumers may scale back operations for lack of stocks.

St. Louis—Sudden, unexplained drop in inquiries for cold-rolled sheets is reported. Calls for ingots and slabs, neither available for conversion here, are up. Local sheet producers have made fourth quarter allocations which were generally under the preceding quarter. Producers are deferring all decisions on price policy, preferring to wait as long as possible on the eastern steel centers.

Birmingham—Demand for sheets skyrockets. Regular users are asking for more tonnage. There is slight prospect additional tonnage will be available in the near future.

Los Angeles—Fabricators are trying hard to maintain inventories of flat-rolled. Postponed mill delivery dates, reduced allocations, coupled with sudden work surges, eat into fabricators' reserve stocks at furious rate.

Steel Bars . . .

Bar Prices, Page 121

Cleveland—Merchant bar buyers are finding it increasingly difficult to get all the steel they need to maintain operations. Efforts to acquire tonnage from other than regular supply sources are proving fruitless, and regular suppliers are holding strictly to established quotas. No relief in tight supply conditions is likely over coming months with the mills entering fourth quarter with heavy carryover. Cold finishers are forced to limit forward commitments to the extent of hot bar supply in sight. Alloy bar demands continue to increase.

Boston—Most cold finishing mills could roll more stock if hot-rolled bars were available, but with the latter sold out through balance of this year ex-quota tonnage is out. Both carbon and alloy rolling schedules are subject to revision, depending on armament contracts. Some are appearing for alloys for which no established quotas exist, including one large gun barrel order placed with a Worcester shop. This contract totals $890,000, well in excess of any alloy allocation to that shop. Watertown, Mass., arsenal closes Oct. 4 on 5370 tons of bars and 238 tons of nickel.

New York—Carbon bar mills enter fourth quarter with heavy carryovers. Any armament tonnage will be taken at expense of civilian orders. Rolling schedules are subject to revision.

Philadelphia—Bulge in alloy buying extends into first quarter in limited volume with specifications likely to be revised where high nickel and chromium content is concerned. Fourth quarter orders are increasingly affected with leaner alloys and NE grades substituted where possible. For free machining high sulphur stock there is a trend toward resulphurized open hearth steel at the expense of bessemer.

Pittsburg—Most cold finishers are able to maintain 5 days per week operating pace but fourth quarter delivery promises from hot bar suppliers have been pushed back and tonnage allotments are reduced. Some coldfinishers have tentatively lined-up production schedules into first quarter, based on large tonnage order backlogs. Extent of military tonnage requirements has not yet been determined, making it impossible to promise firm deliveries more than 60 days ahead.

Chicago—Rail steel bar prices are in turmoil, soaring cost of rerolling rails being blamed. Two divisions of Borg-Warner, Calumet Steel and Franklin Steel, have advanced merchant bar prices to 4.00c. Reinforcing bar prices will now be quoted "on application." On Sept. 18 these two producers increased fence posts to Col. 125. Inland Steel's price of 3.75c which became effective Sept. 1 applies only on merchant rail steel bars, rail steel reinforcing remaining at 3.45c.

Seattle—Reports were current here last week to the effect two Pacific Coast producers of hot-rolled bars and bar shapes had advanced prices $8 per ton to 4.57c and 4.60c mill.

Structural Shapes . . .

Structural Shape Prices, Page 121

Boston—Heavy volume of fabricated structural steel work is being estimated, notably bridges with bids in on a double deck steel truss spanning Charles river, Boston. Of 1520 tons required, bid direct, 675 tons are silicon grade. In addition to several large-tonnage contracts, inquiry for smaller lots is mounting, notably for schools. Prices for fabricated work are firmer with plain material short. Some shops are booked beyond reduced quotas, and, with November blanked out by one eastern mill, will pay premiums for available tonnage.

Philadelphia—Fabricated structural steel volume up for estimates is maintained at high level, including 3200 tons. Pennsylvania state bridges. Extended deliveries have moved some work ahead of schedule with steel being bought direct. On the other hand extended shop deliveries and curtailed allocations of plain material prompt fabricators to go slow on further long commitments.

Pittsburgh—American Bridge Co. booked 10,000 tons of structural steel for transmission towers for Brazil. Pending work includes: 4000 tons bearing piles for Meadville, Pa. bridge; 3000 tons of bearing piles for Equitable Life Co.'s program downtown Pittsburgh.

Chicago—Some consumers of small shapes are losing business to competitors who are obtaining foreign steel. Fabricators generally are operating on limited steel inventories. Considerable Bailey Bridge work is in progress. Small fabricators note a decline in inquiries for low-tonnage jobs and believe considerable work is being shelved.

Birmingham—Fabricators are well booked and demand for structural shapes is stronger than it has been for several months.

Seattle—Scarcities are handicapping fabricators in bidding on new business. Commitments are restricted to potential steel supply. Seattle Light department awarded Bethlehem Pacific Coast Steel Corp. 5300 tons

Pig Iron . . .

Pig Iron Prices, Page 120

Chicago—Rash of price advances on pig iron has not completely spread but consumers are convinced it is only a question of time before the $3 advance becomes general. Interlake Iron Corp. increased its prices $3 effective Sept. 22.

Foundry operations are limited by the amount of iron and coke available.

Boston—Mystic furnace foundry iron is $1.75 per gross ton higher for fourth quarter, $52.25, Everett, for No. 2 foundry, plus usual differentials for silicon, phosphorus and manganese. Increase is based on August costs when for the first time since July, 1949, production surpassed 13,000 tons, minimum for any month on which following quarter prices are based. Bulk of No. 2 foundry and malleable consumers in this area are affected. Shipments from Everett are heavier and most shops are beginning to book more orders for castings. Basic consumers are covered through the year, mostly on foreign iron with prices higher for both New York state and imported tonnage.

Watertown, Mass., arsenal closes Oct. 4 on 262 tons of special grade pig iron; also 120,200 pounds of ferrosilicon, 126,000 pounds of ferromolybdenum and 139,200 pounds of ferromanganese.

New York—As demand mounts pig iron supply tightens, notably merchant tonnage available from Eastern Pennsylvania. Lack of tonnage for shipment is factor in failure of some producers to follow the recent $3 price increase made by several furnaces. Foreign iron prices are higher. One seller of Dutch iron is sold out through this year. Current arrivals of imported iron are against old orders, but new buying and negotiations for foreign tonnage are heavier, including purchase of around 100,000 tons of German basic.

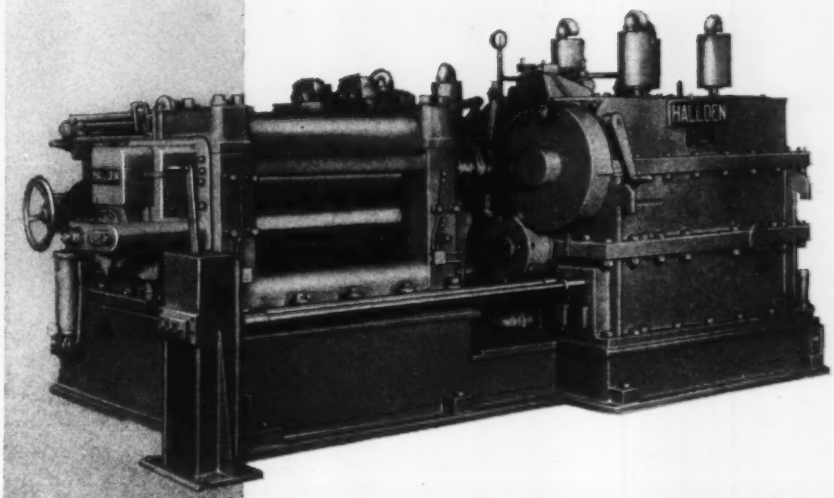
Philadelphia—Failure of two producers of merchant pig iron to follow the recent price increase is due to lack of tonnage to sell. One is taking no new orders while another has little beyond backlog orders with one idle furnace due back in operation the latter half of October. There is reason to believe that when new sales are possible the price increase will be followed. Meanwhile supply of foundry iron tightens. More interest is manifest in foreign iron with prices for imported tonnage higher, reported near $52 f.a.s.

Pittsburgh—Shenango Furnace Co. advanced pig iron prices $3 per gross ton, effective Sept. 25, in line with moves initiated by other producers. U. S. Steel has not yet followed other producers in raising pig iron quotations.

High production costs also have resulted in a $2 per gross ton advance in contract price for charcoal pig iron to $62, Lyles, Tenn.

Intensified effort to speed up relining and enlarging hearth to 18½ feet of the No. 3 furnace at Clairton Works of Carnegie-Illinois Steel Corp. has resulted in completing the job within 72 days, 8 days ahead of schedule, and made possible an extra

HALLDEN AUTOMATIC SHEARS



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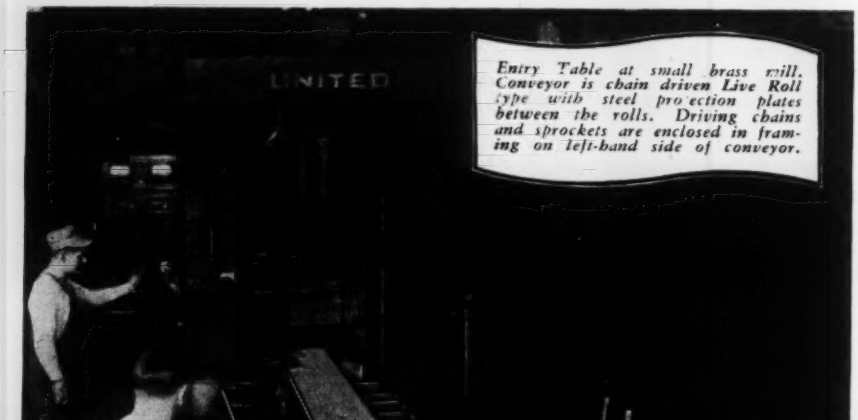

Entry Table at small brass mill. Conveyor is chain driven Live Roll type with steel protection plates between the rolls. Driving chains and sprockets are enclosed in framing on left-hand side of conveyor.

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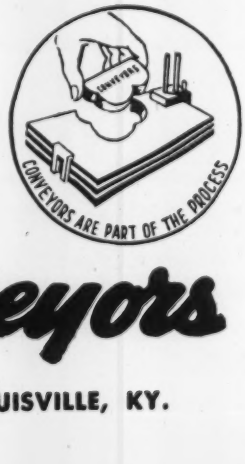

Logan Conveyors

LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

production of 2000 tons of ferromanganese. Shortage of ferromanganese has prompted company to put three furnaces on production of this ferroalloy and plans also include the rebuilding of the No. 3 stack at Isabella Works for production of ferromanganese about first of year. National Tube Co. blew out its No. 1 stack at McKeesport Works last week for relining. Other producers have all furnaces on active list, 43 out of 47 units pouring iron.

Buffalo—Demand for merchant pig iron is gaining despite the $3 increase in prices. Pickup in melting is more widespread. Number of foundries, especially on heavy machinery castings, are subletting orders.

Cleveland—All signs point to continued tightening of merchant pig iron supplies. Producers are allotting tonnage to foundries on the basis of past sales records. This is not enough to permit expansion in foundry melt to the extent some shops would like.

With the exception of the American Steel & Wire Co., all merchant iron sellers here now are quoting the $3 per ton advance initiated a week ago. Interlake Iron Corp. put the higher schedule into effect Sept. 22 following earlier action by Hanna Furnace Corp. and Republic Steel Corp. On Sept. 27 Republic extended its action from the Buffalo and Cleveland districts to include Birmingham, Ala., and Troy, N. Y. At Birmingham prices were raised $3.50 per ton but at Troy the advance was held to $3.

Cincinnati — District melters are scouring the market for pig iron as normal sources trim specifications to a rationing basis. Overall shipments into the district are heavier. Castings backlogs are growing.

Granite City, Ill.—The Koppers Co. raised the price of all grades of pig iron $3 per ton, effective Sept. 27.

Birmingham—Demand for pig iron is heavy. Merchant melters claim they cannot possibly supply all buyers. Regular customers are being taken care of first and the others as long as the supply lasts. Production, except for one Republic furnace, is at capacity. The three district merchant iron producers last week raised prices $3.50 per ton, bringing basic to $45.38 and No. 2 foundry to $45.88.

Los Angeles—Melters' 60-day backlog of orders require 5-day work weeks with overtime. Orders are evenly balanced between war work and commercial work.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

Pittsburgh—Demand for reinforcing bars exceeds supply. Fabricators' backlogs extend three to four months. Carnegie-Illinois booked 900 tons for a veterans hospital here.

Seattle—Rolling mills are booking small tonnages of reinforcing bars demand continuing heavy for schools, business structures, hospitals and military installations. Merchant bars are moving freely, mostly for stock replacements. Mill backlogs are large and operations continue at capacity. Bids are in for the Washington state Cowlitz river bridge, involving 800 tons, reinforcing.

Wire . . .

Wire Prices, Page 123

Philadelphia—More cold drawn wire products are under closer allocation, representing less tonnage to consumers in fourth quarter. Operating on shorter lead time, some November schedules, specialties excepted, were not fixed until the last week in September. Demand for wire products is on a broader base, including more alloy tonnage and mounting requirements for aircraft.

Cleveland—Tight wire supply conditions is further intensified in this district by continued shutdown of the Cuyahoga works of the American Steel & Wire Co. by a wildcat strike. The plant has been idled for almost two weeks, causing a production loss of over 20,000 tons of rods, cold-rolled strip and wire. Hope was expressed late last week that the strike would be terminated shortly.

Chicago—Wildcat strikes at American Steel & Wire's Joliet and Waukegan works completely halted production at those plants last week. No grievance was filed. Jobbers' inventories of most wire products are at the lowest level of the year. Merchant product shortage is most critical in nails and automatic baling wire.

Birmingham—Wire products supply grows tighter. Smaller users are having difficulty getting nails and fencing.

San Francisco—Expected slowing down of home building within the next month or two is counted on to relieve the nail shortage.

Tubular Goods . . .

Tubular Goods Prices, Page 124

Pittsburgh—Producers have not adjusted galvanized pipe prices upward $5 per ton in line with action initiated Sept. 15 by Laclede Steel Co. Action may be delayed by major producers pending wage developments. Well sustained building activity accounts for continued heavy demand for electrical conduit. Sellers note an increasing number of "preferred" tonnage inquiries, although on overall basis the tonnage remains small. Pressure for oil country goods is heavy. Jobbers' stocks are unbalanced. Pittsburgh Tube Co. plans to discontinue production of black and galvanized standard pipe at end of year because of semifinished steel shortage. Company's output after that date will be limited to butt weld and cold drawn mechanical tubing.

Los Angeles—Public works construction for new or expanded water facilities, unaffected by war conditions, is adding to demand for tubular goods. Los Angeles Board of Public Works gave the go-ahead to start immediately $21 million sewer modernization and expansion program.

San Francisco—Most oil companies face a serious shortage of casing with signs new well drilling will be curtailed unless adequate supplies are found.

Seattle—There is little activity in the cast iron pipe market, but other types are moving. Sellers report deliveries 180 days, a formidable competitive handicap.

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Plates . . .

Plate Prices, Page 121

New York—Stringency in plates has intensified without material bulge in shipyard requirements, but this situation may be reversed. Federal Maritime Administration is considering plans for construction of at least 50 higher speed cargo vessels capable of making better than 18 knots. Plates required represent heavy tonnage.

Philadelphia—For fast cargo ships planned by Federal Maritime Administration approximately 220,000 tons of plates will be required. Added to the heavy load already carried by plate mills, additional semi-finished must be assigned rolling capacity if this requirement is to be filled. Also conversion of some sheet and strip capacity for plate production may be necessary. As a matter of fact, some plate tonnage is now being produced on strip mills.

Chicago—Mills have not had to pile any steel for lack of transport. No universal policy has been adopted with respect to supplying freight car builders. December quotas, in some cases, have not been issued because allocations may force cutbacks. Price of domestic fuel tanks is up sharply reflecting high cost of steel purchased in the gray market.

Birmingham—Regular plate users are being moderately supplied. There is slight prospect of any tonnage being available for those not already on the books. The available tonnage is not as great as it was a year or two ago because of steel pipe production at Gadsden.

San Francisco—Demand is increasing on fears of on increasingly tight supply in coming months.

Seattle—Several projects involving sizable tonnages of plates are pending but fabricators are bidding cautiously in view of the extreme shortage of steel. Seattle plans a pipe line extension calling for 3000 tons. Bids are called Oct. 2 for 400 tons for the Detroit dam penstock and bids are in for 500 tons of piling for a Washington state bridge.

Canada . . .

Toronto, Ont.—Production of steel ingots and castings in the first seven months this year set a record, while pig iron output fell slightly below output in the like period of 1949.

Production of steel ingots and castings totaled 1,953,214 net tons compared with 1,914,871 last year and 1,840,468 tons in 1949.

In July output amounted to 264,190 net tons, a daily average of 78.2 per cent of rated capacity and comparing with 276,423 or 84.5 per cent for June and with 238,830 tons or 70.7 per cent for July, 1949.

Pig iron production for the first seven months totaled 1,296,206 net tons compared with 1,310,452 in the 1949 period.

For July pig iron output totaled 194,016 net tons, daily average of 83.2 per cent of capacity. This compares with 198,462 tons or 87.9 per cent for June and with 175,381 tons or 75.2 per cent for July, 1949.

Warehouse . . .

Warehouse Prices, Page 125

Boston—Warehouses enter fourth quarter with low stocks, notably flat-rolled and standard carbon products. Tonnage moving from warehouses is screened. Volume of steel in wanted grades and sizes on which mills are firmly committed to distributors for fourth quarter is lowest for any three months this year. Prices on galvanized are higher in line with zinc increase, but prices vary up to 20 cents per 100 pounds, depending on source and freight.

Philadelphia—Steel warehouses are losing inventory. Sheets and plates are notably short and what tonnage comes in moves on without going into stock. Some old orders with mills for fourth quarter are cancelled, others reduced and the outlook for rebuilding stocks is dim.

Cleveland—Local warehouses are receiving shipments from the mills steadily but tonnage is not sufficient to match consumer requirements and as a result distributors' stocks continue to shrink. Supply conditions are especially acute with respect to light, flat-rolled products and plates.

Chicago—Regular customers are allocated steel by some warehouses much the same as mill customers are. Some distributors limit shipments to ½ ton per customer. This fails to cover minimum requirements of many and the number of buyers in the gray market for a ton here and there has increased.

Cincinnati—The warehouse market is featured by a decline in demand for structurals attributed to fear the scarcity in steel may hamper new projects. Inventories of flat stock are exhausted.

Los Angeles—More mill customers are turning to warehouses to replace tonnage cancelled or postponed by mills. One distributor faces a mill allocation of 10 to 25 per cent of the flat-bars needed for last quarter estimated requirements.

San Francisco—Warehouses report increasing difficulty in replenishing stocks. Sheets, plates, and structurals are in greatest demand and tightest supply.

Seattle—Warehouse volume is heavy but would be greater were stocks available.

Iron Ore . . .

Iron Ore Prices, Page 125

Cleveland—The season ore shipshipment deficit resulting from late opening of navigation on the Great Lakes is steadily being reduced. The season movement now is only 8,577,671 tons behind that of 1949, totalling 56,482,137 tons against 65,059,808 tons in the like period last year.

Whether shippers will be able to bring down enough tonnage before the shipping season ends to prevent an ore shortage next spring is a moot question. Blast furnace operators continue to express concern and it is reported a number of steel companies are considering bringing down ore to the mills by rail from the Lake Superior district. The U. S. Steel Corp. has been shipping by rail for some weeks past.

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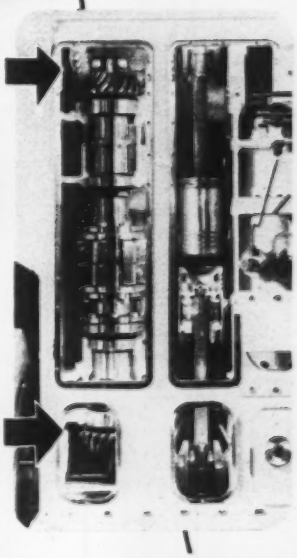

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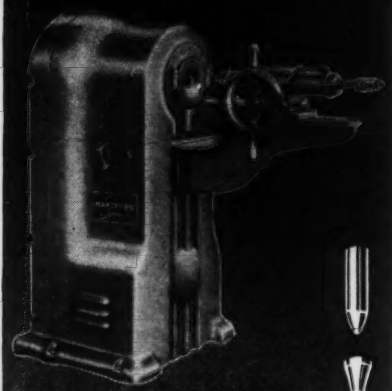

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Scrap . . .

Scrap Prices, Page 128

Pittsburgh—Only significant change in scrap quotations is an advance of $1 on short shovelings to $38. This indicates abandonment by the mills of efforts to establish a price for blast furnace scrap at $10 below the level of No. 1 heavy melting industrial grades.

Brokers and dealers contend the growing freight car shortage is adversely affecting shipments and there is additional threat of manpower shortages for collection and segregation of scrap in desired volume to sustain steel output at present record levels.

The mills continue to purchase relatively small quantities of dealer open-hearth grades at formula prices. Reported weakness in No. 2 heavy melting has not been substantiated in lower mill purchase price.

Boston—Scrap prices appear stabilized for the present with cast grades showing slight additional strength. Buying of steel grades is steady with the exception of No. 2 heavy melting on which the mills appear well supplied. In taking No. 2 some consumers ask for a certain percentage of No. 1 grade in shipments.

New York—Cast scrap is $1 to $2 higher with buying heavier. Demand for steel scrap is steady with mills taking even flow of shipments. For eastern Pennsylvania No. 1 heavy melting and No. 1 bundles are on basis of $34.50 shipping point. Arrivals of foreign scrap are steady.

Philadelphia — Demand for cast scrap is heavier at higher prices, $2 ton on some grades. Limited pig iron inventories with smaller volume available spurs buying of cast and foundry melts carry higher ratio of scrap. Backlogs and new orders with gray iron foundries are mounting. Steel grades follow the formula prices with few price spreads.

Cleveland—Representative sales of the steelmaking grades of scrap have been made locally at the so-called formula prices and the market appears well stabilized on the basis of $42.50 to $43.50 for No. 1 heavy melting steel.

Blast furnace grades are showing decided signs of strength though prices for the time being are marking time. Foundry grades are very strong with foundries paying premiums for desirable material.

Detroit—Determined efforts are being made to adhere to price stabilization formulas, and what differences of opinion have developed are largely a matter of interpretation. Some resistance is encountered to the $2.50 premium on electric furnace material when it may be nothing more than standard bundles. Differential on turnings now is reported only $6 below No. 1 heavy melting, instead of the former $10. The latest automotive lists are said to have been awarded exactly on the stabilization pattern. Foundry grades are soaring in the absence of any price resistance by buyers. Dealers are holding No. 1 cupola cast for $50, and a sale of clean auto cast brought $48.

Buffalo—Price advances of $1 to $3 a ton were posted on cast scrap last week. No. 1 cupola was reported $41.50-42. Dealers continue to ship against recent large orders. At least one big yard is complaining of a labor shortage.

Cincinnati—Heavy melting steel is up $1, at $42, in line with sales to mills not observing recently effected stabilization formula. No. 1 railroad heavy melting is up, $2 at $46. Cast is strong, on avid buying by melters. Tonnage is coming out in fair volume.

Chicago — Formula prices show signs of cracking. Brokers are pressing hard to cover old No. 1 heavy melting orders at $39.50 and many are having to pay the $40 consumer price for tonnage. One important turning consumer has had to increase his offering price. The new Chicago delivered price is at a minimum $2 higher. Reroling rails are stronger. Scramble for cast scrap continues Some traders note a softening in low phos prices.

St. Louis—Scrap market is dull. Gray iron foundries gave a fillip to prices, lifting No. 1 cast, heavy breakable and auto cast $1 to $2. Mills have 45 to 60 days supply and are buying only at their own price.

Birmingham—Scrap is strong with a definite tendency upward although brokers and dealers report no change last week. Expectations are a jump in heavy melting and some cast grades will be experienced before end of the week.

Los Angeles—Mills, seeking to promote the flow of scrap here advanced buying prices $1 to $7 on most grades. No. 1 heavy melting is up $3 to $26.50, No. 2 $3 to $24.50, No. 1 bundles $7 to $26.50, and No. 2 bundles $3 to $22.50. No. 3 bundles, now $17.50, are up $1. Punchings and plate scrap fell $9 to $35.50. Mills are paying $37.50 for No. 1 railroad heavy melting. Vigorous foundry activity boosted No. 1 cupola cast $2.20 to $45.

San Francisco—Mills have entered the market on a large scale and demand is outpacing supply. Prices are moving up, No. 1 heavy melting having risen $1 to $24.50 and bundles an average of $3 a ton. Evidently mills are trying to lay in heavy stocks.

Seattle—Foundry operations are active, spurred by military activity. Cast iron scrap is easier, plants obtaining sufficient for current needs. The minimum price is $30 but $34 is being paid truckers, $36 where a long haul is involved.

To relieve the scrap shortage, Bethlehem Pacific Coast Steel Corp. is shipping more than 30,000 tons here from offshore points. Two full cargoes from Europe, two from the Orient and two barge loads from Hawaii are said to be afloat for discharge at Pacific ports, one lot being due in Seattle Oct. 7.

Coal Chemicals . . .

Coal Chemical Prices, Page 124

Pittsburgh — Pure benzol prices were advanced by U. S. Steel Corp. and Bethlehem Steel Co. 5 cents per gallon Sept. 15 and 25, respectively, at various production points. Previously producers had advanced toluol and industrial xylol 1.25 to 2.75 cents per gallon. Sulphate of ammonia price range is unchanged at the level established last May.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 124

Pittsburgh — Scarcity of foundry oven coke has increased demand for Connellsville beehive grades, resulting in another 50 cents per net ton increase to $16-$17. Pittsburgh Coke & Chemical Co. also advanced the Neville Island, Pa., price $1 on oven foundry coke to $22 per net ton, effective Sept. 18.

Supply of oven foundry coke is well below requirements, but the situation is expected to improve with resumption of operations by Semet-Solvay and Diamond Alkali. Some coke has been shipped here from the East.

Geneva Steel Co., Geneva, Utah, has awarded Koppers Co. Inc., contract for construction of a battery of 23 coke ovens at its Ironton plant near Provo, Utah. The battery of 23 Koppers-Becker ovens, gun flue type, will have carbonizing capacity of 600 net tons of coal daily.

Cleveland—Settlement of the 67-day strike at the Diamond Alkali Co. plant near Fairport, O., is expected to have a salutary effect on coke production by the company. Oven coke output at the company's plant at Painesville, O., has been maintained around 50 per cent of capacity, enabling it to partially serve its foundry customers in this area right along. Expectations are output will be immediately enlarged.

Coke supply is extremely tight and consumers have been compelled to bring in tonnage of less desired quality material from distant points to sustain operations.

For the moment oven coke prices are unchanged, but an advance of at least $1 per ton is expected shortly, the Pittsburgh district producer already having effected such an increase.

Chicago—Foundry coke producers are struggling with cost sheets. There has been no increase in prices but doubt is expressed the price line can be held. Shortening of coking time is regarded a distinct possibility for some producers. While this means deterioration of quality it is thought to be the only solution to the supply stringency.

Birmingham—Sloss-Sheffield Steel & Iron Co. plans early construction of 30 new by-product coke ovens at its North Birmingham operations at a cost in excess of $2 million. The new ovens will increase coke capacity to about 70,000 tons monthly.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, transmission towers for Brazil, to American Bridge Co., Pittsburgh.

5300 tons, galvanized steel transmission towers, Seattle Light Department, to Bethlehem Pacific Coast Steel Corp., Seattle.

2500 tons, nylon yarn plant, E. I. du Pont de Nemours & Co. Inc., Kingston, N. C., to Ingalls Iron Works, Birmingham.

1100 tons, power plant, Hudsonville, Ill., for Central Illinois Public Service Co., Springfield, to American Bridge Co., Pittsburgh.

1020 tons, senior high school, East Providence, R. I., (100) Providence Steel & Iron Co., Providence, (900) American Bridge Co., Pittsburgh; E. Turgeon Construction Co., Providence, general contractor.

650 tons, junior high school, Harrisburg, Pa., to Standard Equipment Co., Harrisburg.

630 tons, factory and office additions, Manning-Maxwell & Moore, Inc., Stratford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Edwin Moss & Sons, Inc., Bridgeport, general contractor; Topper & Griggs, Hartford, awarded reinforcing steel.

600 tons, bridge, Reading railroad, Tulpehocken Creek, Reading, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

450 tons, building for YWCA, Buffalo, to R. S. McMannus Steel Construction Co. Inc., Buffalo; Siegfried Construction Co., Buffalo, general contractor.

410 tons, Linwood Shopping Center, Fort Lee, N. J., to Grand Iron Works, New York.

300 tons, bridge, Wisconsin State Highway Department, to American Bridge Co. Louis Arnold Co., Eau Claire, Wis., contractor.

285 tons, addition, milk plant, Hood Milk Co., Boston, to A. O. Wilson Structural Co., Cambridge, Mass.; William M. Bailey Co., Boston, general contractor.

265 tons, senior high school, Barrington, R. I., to American Bridge Co., Pittsburgh; Rowley Construction Co., Pawtucket, R. I., general contractor.

225 tons, three rolled beam bridges, Glastonbury, Conn., to Electric Boat Co., Groton, Conn.; Bunaili Construction Co., Southington, Conn., general contractor.

200 tons, Standard Stamping & Perforating Co., Chicago, to American Bridge Co.

135 tons, addition, Roger Williams hospital, Providence, R. I., to Tower Iron Works, Providence; E. Turgeon Construction Co., Providence, general contractor.

130 tons, incinerator, Brookline, Mass., to West End Iron Works, Cambridge, Mass.;

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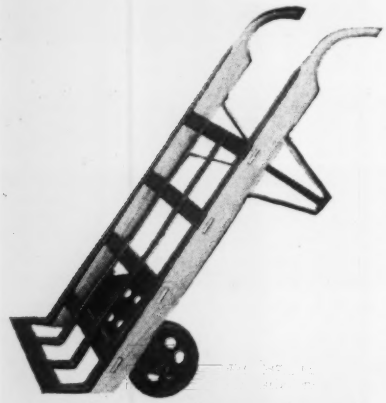

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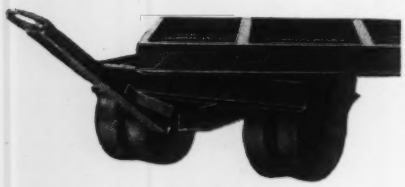

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120 tons, Elmwood Franklin school, Buffalo, to R. S. McMannus Steel Construction Co. Inc. Siegfried Construction Co., general contractor.

120 tons, state bridge and highway, Darien, Conn., to Electric Boat Co., Groton, Conn.; Bunalli Construction Co., Southington, Conn., general contractor; Truscon Steel Co., Hartford, 80 tons, reinforcing bars.

120 tons, junior high school, Portland, Me., to Megquire & Jones Co., Portland; Miller & Beal, Inc., Portland, general contractor; Bancroft & Martin Rolling Mills Co., 50 tons miscellaneous steel.

100 tons or more, school, North Haven, Conn., shapes to New England Iron Works, Inc., New Haven, Conn., bars to Fox Steel Co., New Haven; Fursco Amatruda Co., New Haven, general contractor.

100 tons or more, Brookside housing project, New Haven, Conn., to New England Iron Works Inc., New Haven; Fursco Amatruda Co., New Haven, general contractor; Fox Steel Co., New Haven, reinforcing bars.

STRUCTURAL STEEL PENDING

6500 tons, sheet piling, Cleveland Electric Illuminating Co.

4500 tons, bearing piles, San Francisco Airport Commission.

4000 tons, bearing piles, Meadville, Pa., bridge.

3000 tons, bearing piles, Equitable Life Co.'s building program at Pittsburgh.

2600 tons, state bridge, Beaver Falls, Pa.

2000 tons, state bridges, New York, bids Oct. 11, Albany.

1600 tons, Commonwealth pier No. 1 and Boston & Albany pier No. 2, deep water terminal, Port of Boston Authority, Boston; Merritt-Chapman & Scott Corp., Boston, low $4,521,836; also 6925 tons, 14-in., steel pipe, seamless or electric welded.

1600 tons, hospital building, Montgomery county, Pa.

1520 tons, superstructure, single span through double deck steel truss bridge, Charles River, Boston, American Bridge Co., Pittsburgh, low, bids direct Sept. 26, Boston.

1520, including 675 tons silicon structural steel for trusses, bridge, channel span, Charles river, Boston; bids in.

1155 tons, four bridges and overpasses, Olneyville cutoff expressway, Providence, R. I.; bids in; project also takes 50 tons, structural steel bridge railing.

700 tons, Wharton School building, University of Pennsylvania, Philadelphia.

600 tons, disturbed patients building, state hospital, Hollidaysburg, Pa.

600 tons, state bridges, Berks county, Pa.

390 tons, Bergen county underpass and Route 6 overpass, New Jersey turnpike, Ridgefield Park, N. J. Union Building & Construction Co., Passaic, N. J., general contractor.

360 tons, state bridge and highway, Camden, N. J.; also 100 tons, reinforcing, bids Oct. 17, Trenton, N. J.

340 tons, two-span continuous welded girder and one span rolled beam bridges, Derby-Ansonia, Conn.; Mariani Construction Co., New Haven, Conn., low, $413,463.80.

200 tons, women's dormitory, Dickinson College, Carlisle, Pa., bids in.

135 tons, steel grid floor replacement, Fore River bridge, Quincy - Weymouth, Mass.; Frederick W. Byron, Dedham, Mass., low, design "A" and "B".

120 tons, shapes and bars, single span stringer bridge, Townsend, Mass.; bids in.

120 tons, shapes and bars, 113-foot twin-span continuous rolled beam bridge, Quinnipiac river, Wallingford, Conn.; Brunalli Construction Co., Inc., Southington, Conn., low.

120 tons, shapes and bars, state bridge, Acton-Concord, Mass.; bids Oct. 3.

100 tons, service building, Philadelphia Electric Co., Penndel, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, veterans hospital, Pittsburgh, to Carnegie-Illinois Steel Corp.

305 tons, nine state bridges, Danvers-Middleton-Topsfield-Boxford, Mass., to Northern Steel Inc., Medford, Mass ; Savin Construction Co., East Hartford, Conn., general contractor.

300 tons, miscellaneous awards, including 75 tons Northgate theater, Seattle, to Bethelehem Pacific Coast Steel Corp., Seattle.

200 tons, including 80 tons Seattle Historical Society building, to Northwest Steel Rolling Mills, Inc., Seattle.

135 tons, three rolled beam bridges, East Hartford-Glastonbury expressway, Glastonbury, Conn., to Truscon Steel Co., New York; Brunalli Construction Co., Southington, Conn., general contractor.

130 tons, senior high school, East Providence, R. I., to Plantations Steel Co., Providence; E. Turgeon Construction Co., Providence, general contractor.

110 tons, Mark Twain school, Hartford, Conn., to William Sherer & Co., Hartford; A. E. Stephens Co., Springfield, Mass., general contractor; Topper & Griggs, Hartford, structural steel.

100 tons, senior high school, Barrington, R. I., to G. Fred Swanson, Inc., Providence; Rowley Construction Co., Pawtucket, R. I., general contractor.

100 tons or more, Mary M. Hooker school, Hartford, Conn., structurals to Standard Structural Steel Co., Hartford, Conn., bars to William Sherer & Co., Hartford; Southern New England Contracting Co., Hartford, general contractor.

REINFORCING BARS PENDING

580 tons, four bridges and overpasses, Olneyville cutoff expressway, Providence, R. I.; bids in.

250 tons, mostly mesh, state highway, Lincoln, R. I.; M. A. Gammino Construction Co., Providence, low $1,230,726.94.

180 tons, piers, channel span, bridge, Charles river, Boston; bids in; also 11,400 linear feet steel sheet piling required.

100 tons, also 20 tons shapes, two schedules West canal, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., Oct. 17.

100 tons, treatment plant; bids to Olympia, Wash., Oct. 10.

100 tons, state highway projects; bids to Olympia, Wash., Oct. 10.

PLATES . . .

PLATES PENDING

3000 tons, alternates for concrete, Seattle supply line replacement; bids planned for November.

500 tons, piling Washington state Cowlitz river bridge; bids in Sept. 26.

400 tons, penstock, Detroit dam, Oregon; bids to Consolidated Builders, general contractors, Oct. 2.

RAILS, CARS . . .

RAILROAD CARS PLACED

Akron, Canton & Youngstown, 50 covered hoppers to Greenville Steel Car Co.

Baltimore & Ohio, 1000 fifty-ton box and 20 fifty-ton automobile cars to American Car & Foundry Co.

Chesapeake & Ohio, 1000 seventy-ton hoppers to American Car & Foundry Co.

Delaware & Hudson, 1000 fifty-ton hoppers to Bethlehem Steel Co.

Greenville Steel Car Co. booked 100 fifty-ton box cars and forty 70-ton flat cars for the Western Maryland railway and fifty 70-ton hopper cars for the Akron, Canton & Youngstown railroad.

Illinois Central, 1000 fifty-ton box, own shops, and 120 seventy-ton covered hoppers to American Car & Foundry Co.

Louisville & Nashville, 1000 fifty-ton box to Pullman-Standard Car Mfg. Co.

Minneapolis, St. Paul & Sault Ste. Marie 250 fifty-ton box and 100 fifty-ton hoppers, own shops.

Missouri-Kansas & Pacific, 300 seventy-ton gondolas to Pullman-Standard Car Mfg. Co.

New York, Susquehanna & Western, four rail diesel cars to Budd Co.

Norfolk & Western, 500 fifty-ton box to Pullman-Standard Car Mfg. Co.

Southern Pacific, 1900 box, 1100 gondola, 100 hoppers, 250 covered hoppers and 50 cabooses to own shops, American Car & Foundry Co. and Pullman-Standard Car Mfg. Co.; additional to 1600 fifty-ton box, reported Sept. 25.

2000 box cars, Southern Railway to Pullman-Standard Car Mfg. Co.

St. Louis & Belleville Electric, 50 seventy-ton hoppers to American Car & Foundry Co.

St. Louis Southwestern, 25 seventy-ton gondolas to American Car & Foundry Co.

Western Maryland, 50 box and 50 flats to Greenville Steel Car Co.

RAILROAD CARS PENDING

Atlantic Coast Line, 800 fifty-ton gondolas, 100 fifty or seventy-ton gondolas and 100 fifty-ton hoppers.

Elgin, Joliet & Eastern, 300 fifty-ton hoppers, 100 seventy-ton hoppers, 500 fifty-ton gondolas and 100 seventy-ton gondolas.

Spokane, Portland & Seattle, 200 fifty-ton flats.

Texas & Pacific, 150 gondolas, 250 hoppers, 200 box, 100 flats and 100 covered hoppers.

LOCOMOTIVES PLACED

Erie, six 1600-horsepower all service diesel-electrics and two 1200-horsepower switchers to Baldwin Locomotive Works.

Reading, twenty 1600-horsepower diesel road switching locomotives. Order is divided equally between Baldwin Locomotive Works, Eddystone, Pa., and American Locomotive Co., Schenectady, N. Y.

Terminal Railroad Association of St. Louis, six 1200-horsepower diesel-electric switchers to Lima-Hamilton Corp. and four 1600-horsepower road-switchers to American Locomotive-General Electric Companies.

Missouri-Kansas-Texas, 20 diesel electric, two 2-unit 4500-horsepower passenger and six 1600-horsepower switchers to American Locomotive-General Electric Companies and ten 1500-horsepower road-switchers to Electro-Motive division, General Motors Corp.

Southern Pacific, 50 diesel-electric units, twenty-two 1200-horsepower switchers, ten 1600-horsepower general purpose units and four 2-unit 3200-horsepower road locomotives to Baldwin Locomotive Works; ten 660-horsepower switching units to American Locomotive-General Electric Companies.

RAILS PLACED

Reading, 22,500 tons, 140-lb. rail, to Bethlehem Steel Co.

MARINE EQUIPMENT PLACED

Chesapeake & Ohio, second 406-ft steel car ferry to Christy Corp., Sturgeon Bay, Wis.

FERROALLOYS

(*Continued from page 125*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8 MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C Grade, $1.03 per lb of contained chromium,

One of five American #3800 Crushers used to process 28,198 tons of metal turnings last year at the Canton, O. plant of The Timken Roller Bearing Company.

TIMKEN gets the most out of scrap

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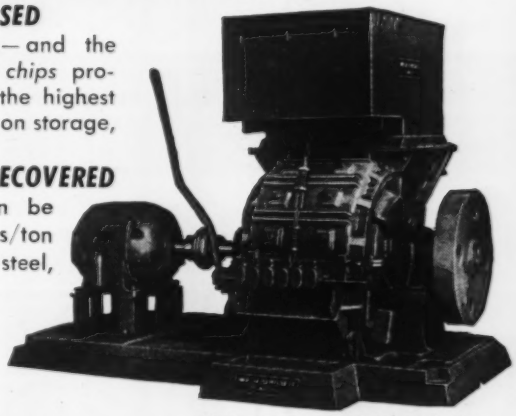
Cutting oil reclamation can be increased to 30-50 gallons/ton when long, curly turnings of steel, alloys, brass, aluminum etc. are American-reduced and washed.



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Originators and Manufacturers of Ring Crushers and Pulverizers

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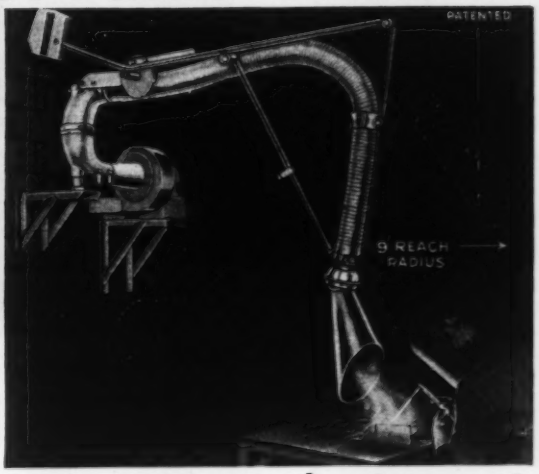
RUEMELIN Fume Collector

(Above) Welding without ventilating snout. Note smoke clouds and poor vision. Gases and heat surround operator's helmet.

(Right) Collecting fumes with a Ruemelin Fume Collector.



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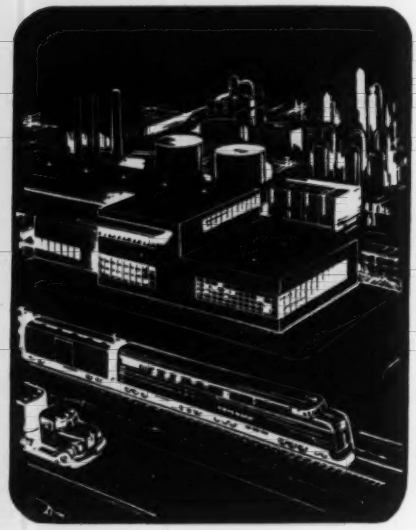

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ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.65c per lb of alloy, ton lots packed 10.05c, 200 to 1999 lb 10.40c, smaller lots 10.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lot 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c per lb; No. 6, 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max.,. C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.0c per lb of alloy; ton lots 18.0c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth $1.04, packed in bags containing 20 lb of molybdenum; Washington, Pa., 95.00c.

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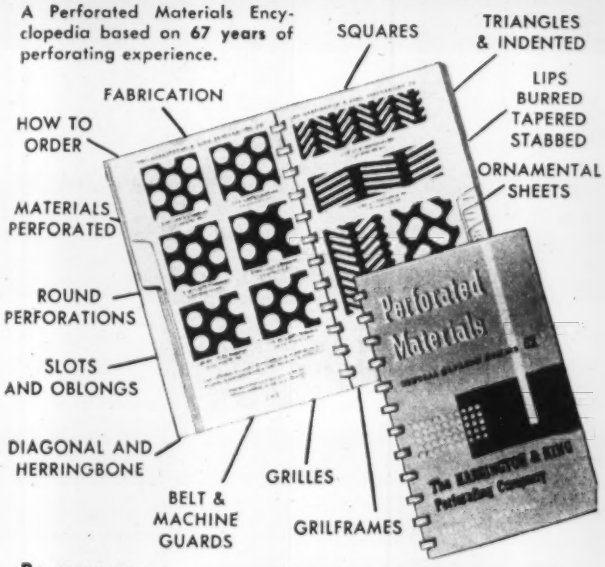

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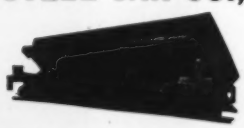

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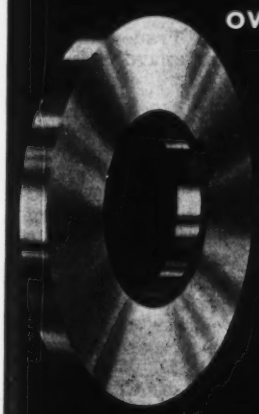

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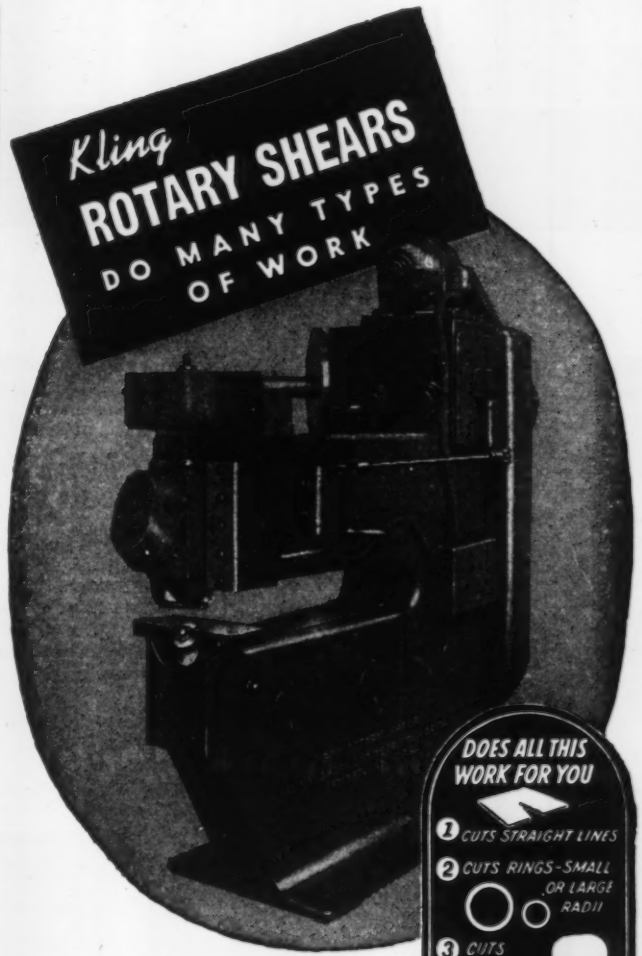

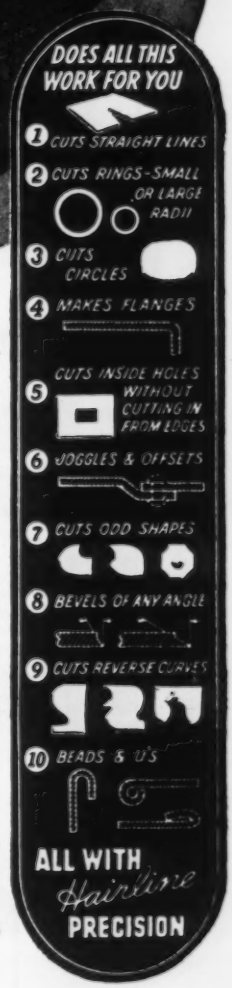
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which will give you specific facts and specifications. No obligation involved. Users of heavy equipment of Kling Rotary Shears' class will receive a copy of this Bulletin promptly, on request.

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

T. C. King Pipe & Foundry Co., Anniston, Ala., has taken over the property formerly occupied by Colonial Industries at Bessemer, Ala. The King company will operate a soil pipe foundry.

Alabama

Alabama Vermiculite Corp. will open a processing plant at 1230 Alabama Ave., Bessemer, Ala. G. O. Greene, president of the company, said the plant will use vermiculite ore mined in the Transvaal region of South Africa. The ore will be shipped to Mobile, Ala., and moved to Bessemer by rail. The finished product will be sacked for shipment to the building industry over the Southeast.

Alabama

Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, has let a contract to A. L. Sullivan, Birmingham, for a $342,000 employment center at Fairfield, Ala. Shaw & Renneker, 2021 Sixth Ave. N., Birmingham, is the architect.

Alabama

Alabama-By-Products Corp., Birmingham, awarded a contract to Koppers Co. Inc., Pittsburgh, for construction of a battery of 29 new chemical-recovery coke ovens at its foundry coke and coal-chemical plant at Tarrant, Ala.

Alabama

Tennessee Coal, Iron & Railroad Co., 2316 First Ave., Birmingham, will construct additions and alterations to its bath house; Van Keuren Davis & Co., American Life Bldg., architect.

California

Belmont Engineering Co. installed new steel fabricating, iron working and die casting machinery at its plant at Belmont, Calif., near San Francisco and is expanding its line of products. It has signed contracts to manufacture aggregate bins and conveyors. Its principal product continues to be steel and aluminum alloy wheelbarrows.

California

Lenkurt Electric Co. started work on a $100,000 addition to its plant at San Carlos, Calif., near San Francisco. Telephone and telegraph equipment will be manufactured in the new plant.

California

Crown Products Co., manufacturer of food and household products, plans to build a warehouse adjoining its San Francisco plant. Cost is estimated at $75,000.

California

California Cotton Mills, a subsidiary of National Automotive Fibres, will complete a new carpet plant in Oakland, Calif., next month, and plans to start production in November. Cost of the expansion is about $300,000.

California

General Electric Supply Corp. opened a new warehouse in Emeryville, Calif. The new depot, which cost about $50,000, will more than triple the company's former warehouse facilities in Oakland.

California

California Electric Power Co. plans construction of an $8 million steam-electric generating plant to be located in San Bernardino county, California.

California

Studebaker Pacific Corp. started construction of a parts depot at its Vernon, Calif., plant.

California

Hydro-Aire Inc., Burbank, Calif., started construction of a laboratory building. The new unit will be used for testing pumps and valves for jet engines and jet powered aircraft.

California

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., is constructing a $50,000 warehouse addition to its Los Angeles plant.

Delaware

Oil Engine Corp.—machinery—was chartered by the corporation department of the secretary of state's office at Dover, Del. U. S. Corp. Co., Dover, is serving as principal office.

Delaware

Capstan Machinery Corp. filed a charter of incorporation with the corporation department of the secretary of state's office at Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as principal office.

Delaware

Anderson Die Casting & Engineering Co.—metals—filed a charter of incorporation with the corporation department of the secretary of state's office at Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as principal office.

Delaware

Hazelton Steel & Tubing Corp. was chartered by the corporation department of the secretary of state's office at Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as principal office.

Florida

Federal Reserve Bank of Atlanta, through W. S. McLarin Jr., received low bid from George D. Auchter at $1,812,800 for a Federal Reserve Bank at Jacksonville, Fla.; Otis Elevator Co., Atlanta, low at $109,750 on elevators; Walter Denson & Son, 902 N. Myrtle Ave., Jacksonville, at $111,000 for air conditioning; Mosler & Co., Atlanta, at $224,500 for vault doors. Toombs & Co., 127 Walton St. N.W., Atlanta, is architect.

Indiana

Kennametal Inc., Latrobe, Pa., moved its Indianapolis district office to Room 620, Board of Trade Bldg., 143 N. Meridian St., Indianapolis 4.

Kentucky

City clerk, Danville, Ky., will receive bids until 2:00 p.m., Oct. 6, for construction of a factory building which when erected may be leased and operated by **General Shoe Corp.,** St. Louis. Plans were drawn by Francis B. Warfield & Associates, architect and engineer, Nashville, Tenn.

Kentucky

Process Fuel Corp. was incorporated in Louisville to engage in manufacture and sale of processed fuels. Incorporators are S. D. Walker and G. S. Van Deusen of Chattanooga, Tenn.

Louisiana

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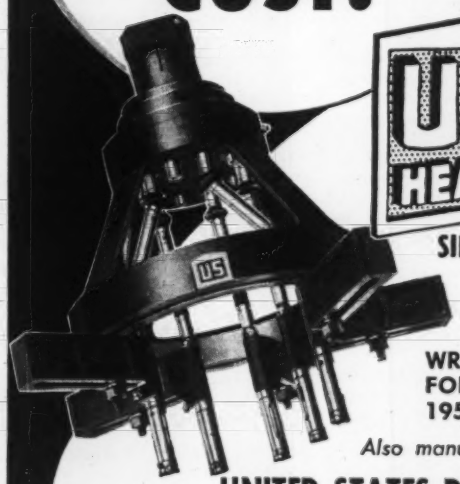

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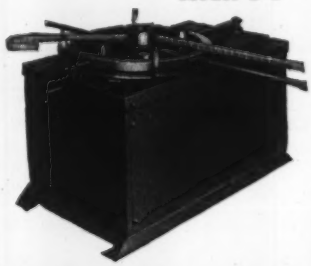
For Concrete Reinforcing Bars

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

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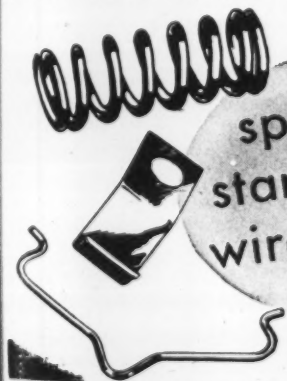

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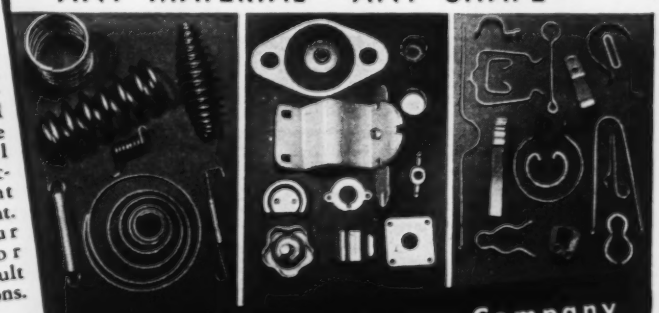

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